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CAUSES and effects reach in an unbroken chain from one event to another in the quick evolution of automobilism. From the Reliability Contest held by the Auto-

Contest Facts for Show Visitors.

ers and amateurs, who were active in the 500-mile contest; who absorbed its lessons

resulted from close study of modern foreign cars and the gradual emancipation of the industry from its first traditions. In the Contest these traditions were still conspicuous,



LAST NATIONAL GATHERING OF AUTOMOBILISTS.—THE 500 MILE RELIABILITY CONTEST.

mobile Club of America in October to the Show which opens to-day in Madison Square Garden, there extends a web of connecting threads which render a review of the contest particularly appropriate at this moment. The men, both manufactur-

and enjoyed its pleasures, will nearly all be present at the annual New York exhibition and deeply interested in observing the progress and the new ideas there to be seen, many of which may be traced to the previous event, while other ones have

consisting partly in adherence to the design of horse-drawn vehicles, and partly in the acceptance of the car developed in the French racing events. The Reliability Contest with its speed limits, and garage arrangements had the indisputable

merit of toning down the ideas received from both sources by showing the contesting cars more nearly under the conditions under which they would ordinarily be used by the public. The little "dinky American horseless cars" were shown to be much more practical than the strenuous advocates of purely French construction had previously been willing to admit, but on the other hand it was found that some of the requirements for extra strength of gears, frames, steering knuckles and for excellence of motor castings and workmanship, would hold good for driving at moderate speed on our roads as well as for long distance racing in Europe. This experience was felt throughout the industry in a general way, and its results are apparent in many of the new models which are displayed at the "Garden," but the exact data which justified new departures in construction were not given to the public until the contest committee of the Automobile Club of America published the Official Report of the contest a few weeks ago, and then in a form which, though elaborate enough, imposed considerable work on any one who would attempt to classify the inferences for which it furnishes the raw material.

In a previous issue of this publication (Dec. 27) the contents of this Official Report were presented with such reference to their general tenor as could be hurriedly compiled, and in the tables given herewith will be found a more searching analysis of the same material, in so far as it relates to gasoline motor vehicles and tires, while the consideration of steam vehicles is postponed to a subsequent issue.

A DOCUMENT TO KEEP.

With the map of the route of the contest added, it is believed that the compilation as a whole will be accepted by all participants in the New York-Boston run as a convenient resume of the most important features of the event, and perhaps also as a document of some value for constructors and an interesting means for tracing progress from the Contest to the Show and forecasting further progress from the Show to the next contest.

The principal table gives the stops of each machine and their duration in minutes and quarter minutes (many stops lasting only a few seconds), and also the replacements of parts at the controls, but not adjustments or repairs at the controls. The classification of the causes of stops varies in some instances from that followed in the Official Report, but in all cases the material given in the Report supplies the reason for the classification adopted, by which it is aimed to bring together those stops which were due to correlated causes, so that the reader may readily see the connection existing between them. In some instances when repairs were made on the road and these repairs subsequently proved unreliable and caused new stops, it was not always found

possible to indicate the connection. So as to strain no point for accuracy where accuracy is impossible, the grouping of stops in families has been held so rough that the table will not support hair-fine deductions, it being the understanding that the available material will permit only broad generalizations, but will not justify many invidious comparisons between the various forms of manufacture represented in the contest.

From this table it may be seen that out of the 56 gasoline motor cars 13 had 27 stops due to tires, consuming in all 971 1-2 minutes, or an average of 36 minutes per stop. Forty-three cars had no tire troubles, but it is noted that five of these took precautions by replacing inner tubes or casings at the controls.

IGNITION TROUBLES OVERESTIMATED.

The ignition troubles, which are so commonly claimed to be the principal annoyance of the motorist, are not found nearly as serious as represented. As it is practically impossible in a contest to distinguish between spark failures which are due to the electric system and those due to faulty carburation or faulty cylinder lubrication, all stops under these heads may be considered as ignition troubles, and those assigned to "uncertain" causes should also be included, as practically only the causes due to carburation or ignition can remain uncertain when the car continues on its way after the stop. But even by inclusion of all these causes for stops as relating to ignition, the showing is not appalling, except in so far as 31 vehicles out of the 56 suffered more or less, indicating that total avoidance of this class of stops depends greatly on the operator as well as on the construction of the vehicle. That 25 vehicles were capable of traveling 500 miles without a single failure in the supply of gas or spark, serious enough to cause an involuntary stop, would probably astonish those who were wont to deride the balkiness of the gasoline motor of a few years ago. And compared with the fact that the 31 machines which had stops from this cause had 103 of them, or an average of more than 3 apiece, seems to show either that the fault lies mostly with the operator's control of the gas mixture or the cylinder lubrication, or that all cars could be made as reliable on this point as the 25 cars which had no trouble.

The total time lost by ignition failures was 561 1-4 minutes, giving an average of only 5 1-2 minutes for each stop, which is much less than the average duration of all other classes of stops. There were from all causes 229 stops (of which 6 could not be remedied in time for continuing in the contest) and their total duration was 4,960 1-4 minutes. Counting the comparative severity of ignition troubles (including carburation and cylinder lubrication) by the time consumed in remedying them compared with the time

consumed in remedying other troubles, we find the proportion of 561 1-4 minutes to 4,960 1-4 minutes, or about one-ninth. As one particularly ill-favored car had 24 stops, consuming 111 minutes, all due to ignition failures, it may be justifiable to contend that less than one-tenth of delays in travel with gasoline motor vehicles is caused by the much maligned ignition and carburation system. On the other hand it is true that counting stops numerically, 103 out of 229 stops were due to this cause, or, if the 24 stops of the one car referred to are deducted, 79 out of 229, or about one-third. This is still very far from the 95 per cent. commonly charged.

In point of time wasted tires were nearly twice as troublesome as the ignition and carburation system, although tire stops were only one-fourth as numerous and occurred in less than one-third as many different cars.

The cooling system has against it 27 stops in 16 different cars, consuming 693 1-4 minutes, or much more than all the ignition troubles, besides disabling one car completely. Valves caused 16 stops in 10 cars, totaling 510 3-4 minutes, or nearly as much time as all ignition troubles, but it is to be noted that 338 minutes out of this total was charged against one car which appeared to have been tampered with by an evildoer.

Since only 8 cars out of the 56 had any occasion to stop to remedy transmission gears, it is clear that imperfections in this part of automobile construction are not of the kind which need to cause stops at an average speed of 14 miles per hour, but when they do occur, nevertheless, they are most serious, according to the showing of the Reliability Contest, 10 stops having delayed 8 cars 373 1-2 minutes, besides disabling two cars.

From the impossibility of figuring an equivalent in time to stops which were final in the contest, a slight inaccuracy creeps into the comparisons between the durations of the several classes of stops, but readers may make mental allowance for this.

DUE TO CARELESSNESS.

A somewhat numerous class is that which has been headed "operation and accident." It includes such stops on hills as are plainly due to the operator's neglect to change gear in time and stops due to other errors of judgment, as when a car is ditched because its driver wishes to avoid a collision or discovers a dog in his path a trifle too late. The gear change stops are always very short, but some of the other ones in this class are of greater duration. The total time loss is 270 1-4 minutes for 23 stops, applying to 17 vehicles.

Under the head "Miscellaneous," will be found the most serious mishaps, including three caused by broken steering knuckles, two broken pistons and one

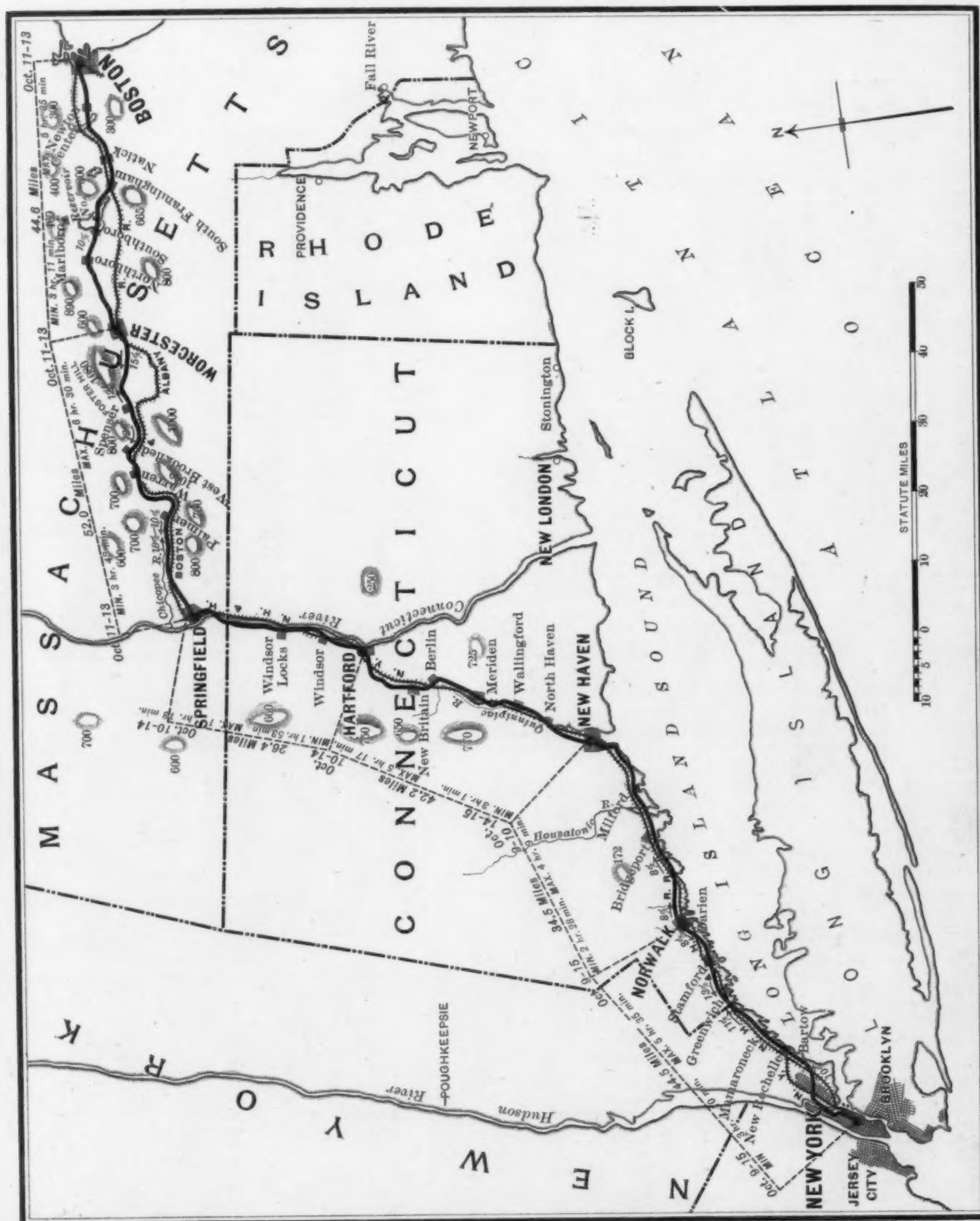
GASOLINE MOTOR VEHICLES IN 500-MILE RELIABILITY TEST.

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broken connection rod. Two of these cars were put out of commission for the run by these breakages, and another might as well have discontinued. Altogether the

also, as the table shows, chain troubles, disordered wheel bearings, brake repairs, broken crank-shaft, misaligned axles and springs, and one case in which the car

cause a definite time was given for the stop due to overheating, and on the other hand it was shown that the car was unable to drive its weight over hills without



COURSE OF A. C. A. RELIABILITY RUN NEW YORK TO BOSTON AND RETURN, OCTOBER 9 TO 15, 1902.
Mileage and time limits of each day's run and percentages of all grades above 7% shown to left of course.

17 stops by 12 vehicles consumed 1,365 3-4 minutes, whereto may be added a liberal allowance for the three cars which went out of the competition. The class includes

withdrew from a cause given in the official report as faulty cooling system and overheating motor, but which is marked in the table as "insufficient power," be-

drawing too heavily upon the reserve power stored by its gasoline motor in an electric accumulator.

The average time for stops in this class,

TABLE OF TIRE DATA AND STOPS DUE TO TIRE TROUBLES.

Giving the Stops between Controls in the 500-Mile Reliability Run and their Duration: also the Repairs and Replacements at Controls, but not their Duration.

GOODRICH DOUBLE TUBE TIRES.			
Vehicle.	Weight.	Tire Dimensions.	Price.
1 C-2600	36x5	30	\$240.00—2 stops; 61 min.; 2 punctures; tire burst at control.
3 C-2100	34x4	23	62.00—
4 C-2100	34x4	23	62.00—1 stop; 9 min.; tube replaced.
10 C-1975	36x4	25	160.00—1 tube replaced; 41½ min.
11 B-1900	36x3½	16	140.00—
17 C-2500	36x4	27	260.00—
18 C-2700	36x4	27	260.00—
23 C-2600	36x4	27	260.00—
24 B-1450	30x3½	16½	164.00—1 stop; 21½ min.
25 B-1450	30x3½	16½	164.00—
26 B-1450	30x3½	16½	164.00—
27 B-1600	30x3½	16½	164.00—1 puncture; tire replaced at control.
28 B-1600	30x3½	16½	164.00—3 stops; 1 hr. 50 min.; 1 tube rep.; punct; pumping.
29 C-2200	34x3½	15	180.00—
34 C-2400	—x3½	10	112.10—4 stops; 3 hrs. 58 min.; 4 inner tubes replaced.
32 C-2150	32x4	13	196.00—
55 B-1600	30x3	14	170.00—
56 B-1600	30x3	14	170.00—
59 C-2200	32x4	13	192.00—2 stops; 1 hr.; 2 tires replaced.
63 A-800	28x2½	10½	50.00—
68 B-1300	—x3	20	75.00—1 stop; 50 min.; 1 inner tube; 1 tire rep.; rep. punc.
69 B-1300	—x3	20	75.00—2 stops; 4 hrs. 15 min.; 1 tire off; 1 puncture; 3 tubes; 1 case replaced.
DIAMOND SINGLE TUBE TIRES.			
2 C-2100	34x4	30	\$166.00—
6 B-1200	30x3	23½	118.00—
35 A-985	28x2½	9	60.00—1 stop to pump; 4 min.; 2 rear tires replaced.
36 A-985	28x2½	9	60.00—1 stop; 5 min.; leaky valve; 1 tire replaced.
37 B-1060	—x3	15½	104.00—
38 B-1060	—x3	15½	104.00—
43 C-2000	34x4	30	208.00—
58 A-900	—x2½	9	60.00—
60 B-1300	30x3	12	60.00—
65 B-1600	30x3½	18	140.00—
70 B-1300	34x2½	—	128.00—
73 B-1350	30x3	14	88.00—
74 B-995	—x3	15	80.00—
79 A-920	28x2½	10	60.00—
80 B-1420	30x3	28½	110.00—tire reset; 56 min.
DUNLOP DOUBLE TUBE TIRES.			
19 A-875	30x3	11½	60.00—3 stops; 33 min.; 3 punctures; 1 tire replaced.
40 B-1450	30x3	12	\$72.90—
42 C-2200	32x3½	20	104.00—
47 B-1400	30x3	15	123.00—
48 B-1400	30x3	15	68.00—
54 A-950	—x3	12	68.00—
64 A-800	28x2½	10½	100.00—3 stops; 1 hr. 5½ min.; 2 punctures; 1 tire off.
67 C-2300	32x3½	20	123.00—
76 C-2100	28x3½	20	123.00—
G & J DOUBLE TUBE TIRES.			
13 B-1350	—x3	14	\$115.00—
14 B-1350	—x3	14	115.00—
15 B-1550	—x3½	14	98.40—
16 B-1800	—x3½	14	98.40—1 stop; 1 hr. 28 min.; 3 repairs.
20 A-800	28x3	12	96.00—3 stops to pump; 11 min.
57 A-800	28x3	12	96.00—
62 C-2600	32x4	25	197.00—
FISK SINGLE TUBE TIRES.			
5 B-1350	28x2½	11	\$48.00—
30 B-1050	28x3	13	75.60—1 tire replaced; 1 puncture.
31 B-1050	28x3	13	76.32—
41 A-800	28x2½	10	48.00—
46 B-1400	30x3	14	68.00—
51 B-1500	28x3	12½	104.00—
75 B-1100	—x2½	11	60.00—
MICHELIN DOUBLE TUBE TIRES.			
21 B-1600	29½x3½	16	\$152.00—3 stops; 1 hr.; 3 inner and 1 outer replaced.
39 B-1200	—x3	15	60.00—1 inner tube replaced.
44 B-1700	30x3	16	152.00—
66 C-2600	—	—	—
71 A-900	28x3½	12	140.00—
GOODYEAR TIRES, SINGLE AND DOUBLE.			
32 B-1300	30x3	12	\$60.00—single tube.
45 B-1125	30x3	15	72.00—double; 2 outer tubes replaced.
61 B-1300	30x3	12	60.00—single tube.
HARTFORD SINGLE TUBE TIRES.			
7 B-1800	34x3	16	\$46.80—
8 B-1650	34x3	16	57.20—1 tire replaced.
INTERNATIONAL SINGLE TUBE TIRES.			
12 B-1300	32x3	24	\$120.00—
CONTINENTAL DOUBLE TUBE TIRES.			
49 B-1950	34½x3½	15	\$260.00—1 tube replaced.
RAMBLER SINGLE TUBE TIRES.			
77 B-1200	—x2½	—	1 puncture; 9 min.

SUMMARY OF STOPS, WITH TOTALS AND PERCENTAGES.

Causes of Stops.	No. of Cars Affected.	No. of Stops.	Stops in Minutes.	Avoidability.	Frequency.	Average Duration.
Tires.....	13	27	971½	77%	12%	36 minutes
Ignition.....	31	103	561¼	44½%	45%	5½ "
Carburation.....	10	15	510%	82%	7%	34 "
Cyl. Lubrication.....	16 (1 Out)	27	693¼	71½%	12%	More than 25½ "
Valves.....	6	7	214	89%	3%	30 "
Cooling System.....	8 (2 Out)	10	373½	86%	4%	More than 37½ "
Clutches.....	17	23	270¼	70%	10%	15 "
Transmission Gear.....	12 (3 Out)	17	1365¾	78½%	7%	More than 80 "
Operation and Accident.....						
Miscellaneous Causes.....						
Totals.....	See Detail Table	229	4960¼		100	

it will be seen, is 80 minutes plus the addition to be made for the three disabled cars. Fortunately stops of this kind are as infrequent and unnecessary as they are serious and annoying, but it is particularly evident that they should not occur in a contest in which the speed is so severely restricted as it was in New York-Boston and Boston-New York run.

A summary giving the main results of the information contained in the detailed table is presented in the small table at the bottom of this page.

By "avoidability" is referred to the chance which a purchaser of an automobile would have for avoiding stops of each class, on a 500-mile run, by selecting from among the competing manufacturers at random, the percentage being determined from the number of cars with stops from each class of causes in proportion to the number of cars which escaped stops from the same causes. By "frequency" is meant the percentage of stops from any one cause in relation to all stops from whatever cause.

Following up the figures a little farther it is seen that a gasoline automobile—as this class of automobiles were last September, not as they will be in 1903 after more recent improvements—would ordinarily have 4,960 divided by 56, or 88 to 89 minutes involuntary delays on a leisurely trip of 500 miles. These 88 minutes would be divided as follows: Tires would claim about 18 minutes, ignition and carburetor about 10 minutes, valves 9 minutes, the cooling system 12 minutes, clutches 4 minutes, transmission gear 7 minutes, mistakes in operation 5 minutes, and all other causes 24 minutes. To this should be added some time at stopping places for cleaning, adjusting and minor repairs.

But a much better chance might, of course be had by exercising a good choice among automobiles instead of taking one at random. An interesting comparison arises on this point when steam vehicles are also taken in consideration. The official report by the Contest Committee furnishes in this respect as many data as here given in regard to the gasoline vehicles which took part in the contest, but they, too, must be compiled in table form before they can be seen at their real value. For lack of space in this issue of THE AUTOMOBILE, the analysis of the steam vehicle performances and stops must be postponed till next week.

In some respects the report is most complete with reference to tires, and the information offered in regard to this very important accessory is set forth in the first table on this page which permits a comparison between the different manufactures and constitutes so far as known, the only document of public record on this subject. Its value is impaired, however, by the fact that the tires, inner tubes and casings were seldom run to a finish, but replacements were made at controls as a mere matter of precaution, frequently superfluous.

The Packard 12-Horsepower Car.

BY HERBERT L. TOWLE.

Externally this machine, Model F, bears close resemblance to the older and well-known model C of the same make, a full description of which was published in *The Automobile* of July, 1901. It has the same wide tread—56 inches from center to center of the wheels, instead of the more common 54 inches; the same tool box in place of the dash, the same uncompromising squareness in its wide body, and the same single lever system of changing the speeds. The engine, too, is but little changed, and the steering gear likewise; but in the transmission mechanism and running gear there have been notable changes.

Examining the latter in Figs. 1 and 2, we see, first of all, that the tubular underframe which characterized the early machine has been abandoned; second, that the rear of the body has been extended to carry the rear axle some 12 inches further back, making the new wheel base 84 inches; third, that, instead of the more usual semi-elliptic rear springs, a modified form of elliptic spring is used, the ends of the upper halves being carried downward in C shape and connected by shackles to the lower halves. This is done to permit the use of regular distance rods to keep the chain taut, the new transmission mechanism not permitting the use for this purpose of the swinging countershaft used in the model C. The arrangement as it stands is a substitute for hinging the upper half of the springs to the body hangers, as in two or three other American machines, or for connect-

ing the body hangers by a cross bar and making them slidable back and forth, as in the older Panhard machines. It certainly gives a very flexible support. It might, in fact, be thought possibly too flexible against lateral forces due to jolting or turning corners, but the writer,



Fig. 1—PACKARD 12-HORSEPOWER CAR WITH TONNEAU ATTACHED.

after watching carefully the action of one of these cars over a rough road, failed to discover any undue sideplay from this cause.

Even more unusual than the rear spring suspension is that employed in front. The reverse elliptic spring of the model C is

retained, but has been modified in detail so as to give an extreme range of vertical oscillation to the front axle, a point well illustrated in Fig. 2. In effect, the spring is made to give a single point of support, so that the body follows the oscillations of the rear axle alone. Although, in common with all systems of three point support, this result is gained only by a certain sacrifice of stability, the makers consider this a point of academic rather than practical importance in consideration of

the great saving in strains on the frame and body of the vehicle.

This arrangement of springs and axle necessitates using in the absence of an underframe, a front set of distance rods to sustain the road shocks suffered by the front wheels. These are clearly seen in Fig. 1, and consist each of a pair of tubes, one above the other, with ball jointed ends, forming a sort of parallel motion which keeps the front axle from twisting or turning over as it otherwise might do. As the front springs are connected by shackles to the axle and the frame, it is necessary to add another distance rod, seen at A in Fig. 3, to prevent transverse motion of this axle. This is doubly important, as the connection from the steering gear runs across, parallel with this distance rod, to the left hand steering knuckle, which would cause any transverse reciprocation of the front axle to deflect the front wheels on account of the lack of "give" in the worm steering gear.

In Fig. 4 is shown the arrangement of the front axle, the hubs, and springs in detail. The front wheels run on 1-2-inch balls. Like the rear wheels, they have wood instead of wire spokes. The front axle is tubular, 2 inches in diameter, with the yoke ends brazed in. The rear axle is shown in plan view, partly in section, in Fig. 6. As will be noticed, it consists essentially of two outer fixed tubes A A, inclosing a divided hollow shaft, 2 inches



Fig. 2—FRONT VIEW OF PHAETON SHOWING FLEXIBILITY.

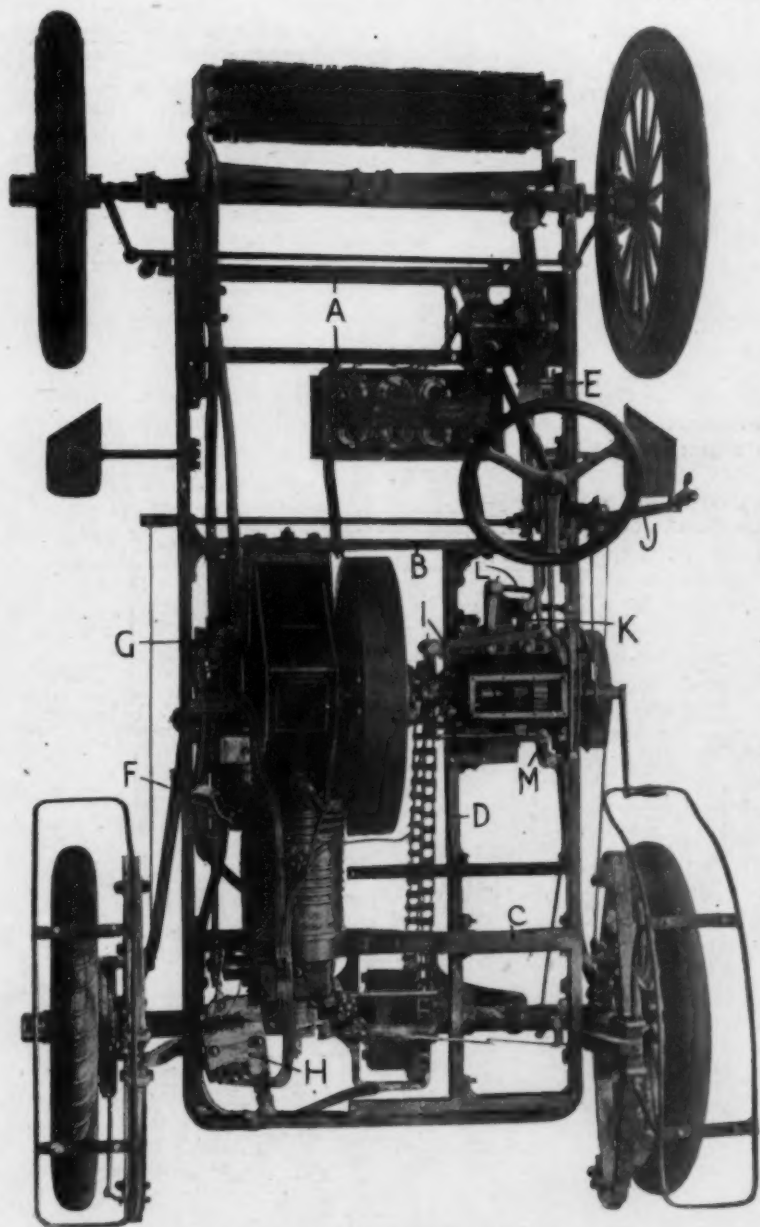


Fig. 3.—PLAN OF PACKARD CHASSIS.

and 1 inch in external and internal diameters, respectively. The main gears *B B*, of the spur compensating gear are keyed to the inner ends of this shaft, and the artillery hubs of the wheels are keyed to the outer ends. The two tubes *A A* are connected by a cast steel frame *C*, into which the enlarged ends of tubes *A A* are threaded at *D*, and which is clamped tight on *A A* by four bolts *E E*. It is open at the front to permit removal of the differential, and when assembled is closed by the through bolt *F*, surrounded by a tube as shown. The effect of the pull on the chain is to put this bolt *F* constantly in tension while the car is running.

The ball bearings, as all ball bearings should be, are of very liberal size, having 3-4-inch balls and ample dust protectors. The hollow driving shafts are prevented from working out by the thread collars *G*, which serve also to adjust the ball bearings.

The main frame is made up principally, with the exception of the four body hangers, of 2-inch channel steel. The side and rearmost transverse members are bent from a single length of channel, and are connected a few inches back of the front end by a narrow rectangle of 1 3-4 inches angle iron. (See *A*, Fig. 3.) There are two channel cross sills, *B* and *C*, one forward of the engine, and the other, which is bent up and down in irregular shape, lying just under the cylinder head. A longitudinal channel *D*, lying between the engine flywheel and the gear case, connects the former transverse member with the rear and serves to support the gear case. It is shown at *S*, in Fig. 9.

The engine, supported by the two cross sills referred to, is of 6 inches bore by 6 1-2 inches stroke. Like all the Packard engines, it has a high compression, and its maximum speed, as in the model *C*, is 850 R. P. M. A special feature is the corrugated copper water jacket, which renders possible a material reduction in the weight, both by its own lightness and from the fact that, with the simplification

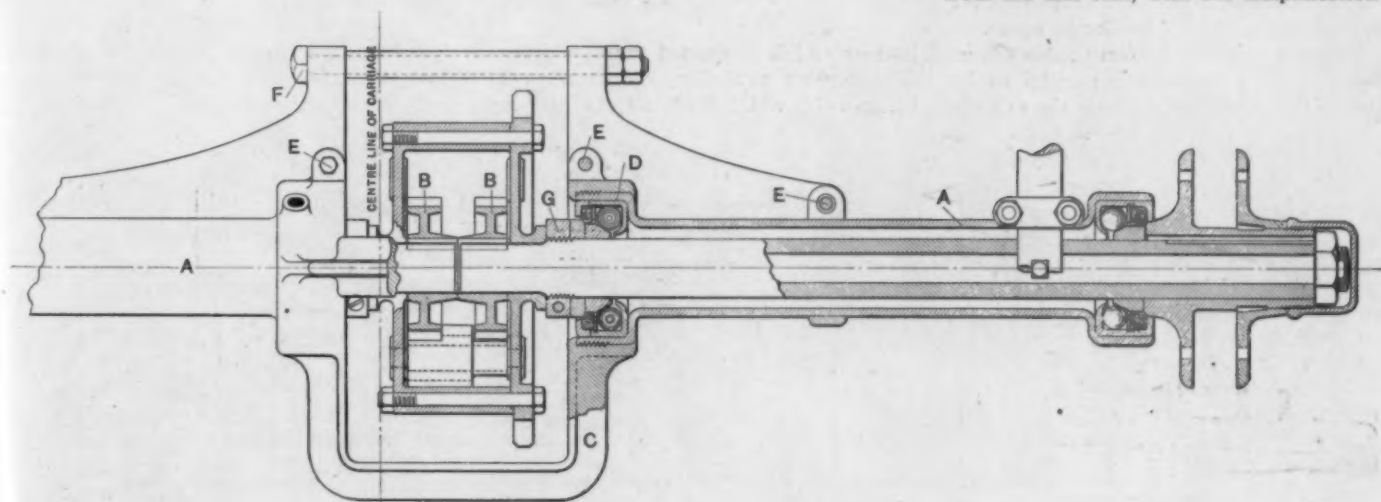
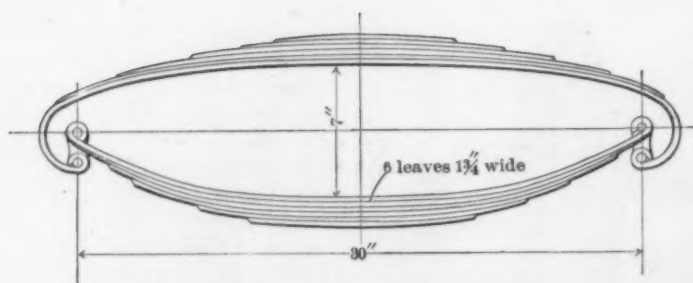


Fig. 6.—REAR AXLE IN PLAN, PARTLY IN SECTION.



Dimensions taken under 700 lb. load each.

Fig. 5 - REAR SPRINGS OF PACKARD CAR.

of the castings, it is practicable to lighten somewhat the cylinder walls. The outside of the cylinder head is first turned smooth, a little smaller than the jacket, and the jacket is then slipped in place and its forward end caulked in a steel ring or flange shrunk on the cylinder. A "follower" ring, similar to the other, is slipped over the cylinder head and shrunk on, and after the caulking is complete at both ends, solder is flowed liberally around the joints as an additional safeguard against leakage.

The arrangement of the exhaust and inlet valves in the cylinder head is shown in Fig. 7. *A* is the exhaust valve, with its stem threaded into a round fork carrying the roller *B*. The fork is guided by the barrel *C*, and the exhaust cam *D* acts directly on the roller. Opposite the valve are two plugs *E F*, closing respectively the combustion and the water spaces. By removing these and unscrewing the valve stem, the valve can be withdrawn or reached for regrinding. *G* is the inlet valve, with a long stem projecting at *H*. The spring (not shown) acts between the washer *I* and the barrel *J*. This barrel rests against the wedge *K*, which is operated through suitable links by the pedal *E* (Fig. 3), under the operator's right foot. Shifting *K* to the left moves *J* backward and restricts the lift of the inlet valve. The adjustment is such that the lift can be reduced to rather less than 1-16 inch, which is just sufficient to let the engine run light at a moderate speed.

Like the engine of model C, this engine has a 2 to 1 shaft lying parallel to its length and operating not only the exhaust

valve but a centrifugal governor at *F* (Fig. 3), which advances the spark automatically, and also a gear circulating pump *G*. At

bearings of engine and gear case. The governor is essentially the same as last year: it is shown in Fig. 8. *A* is the governor weight, which with increase of speed shifts the cam *B*, splined on the 2 to 1 shaft, to the left (i. e., forward). This cam, which acts on the roller *C* of the contact spring *D*, has a "toe" lying at an angle or screw-wise, so that at high speed it acts on roller *C* earlier than at low speed. By this means the ignition is automatically timed to occur as close as possible to the proper moment for the maximum efficiency at any speed.

As with a horizontal engine and jump spark ignition, the splash system of lubrication is hardly satisfactory, the closing

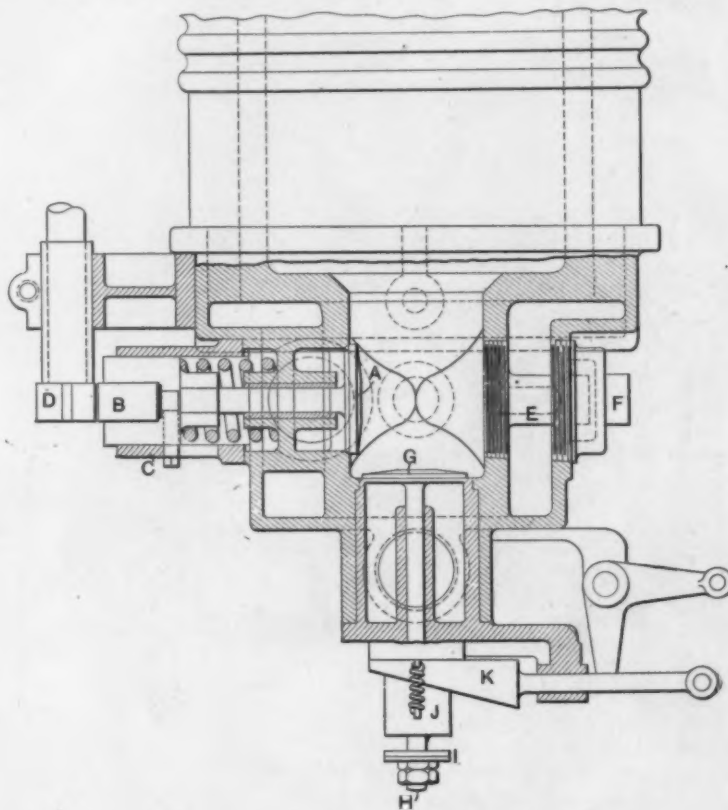


Fig. 7. - CYLINDER HEAD AND VALVES.

its rear end is connected through a flexible coupling a McCanna mechanical lubricator *H*, which feeds all the principal

in of the crank case is more or less a formality, oil being fed mechanically to both crank and wrist pins. To deliver it

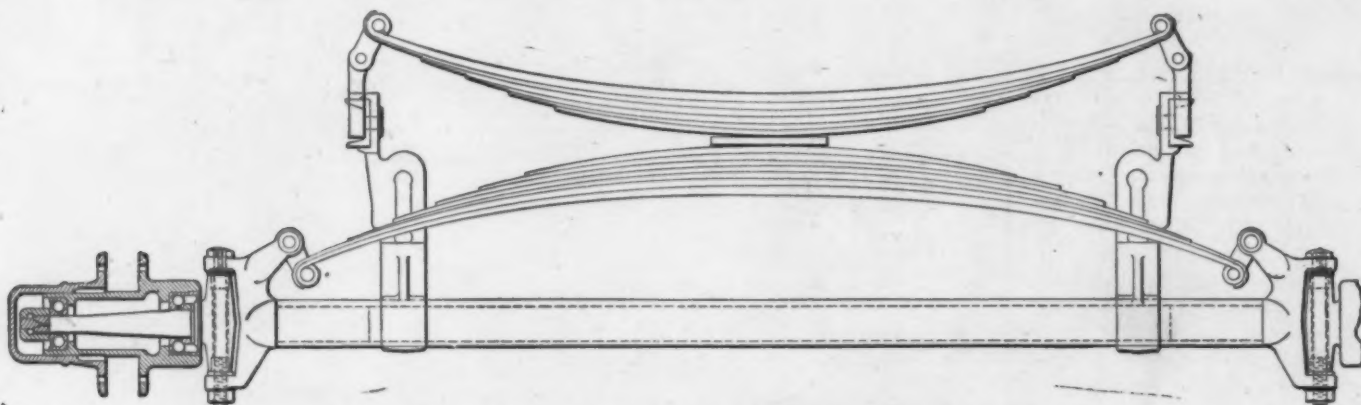


Fig. 4 - FRONT AXLE AND SPRINGS OF PACKARD CAR MODEL F.

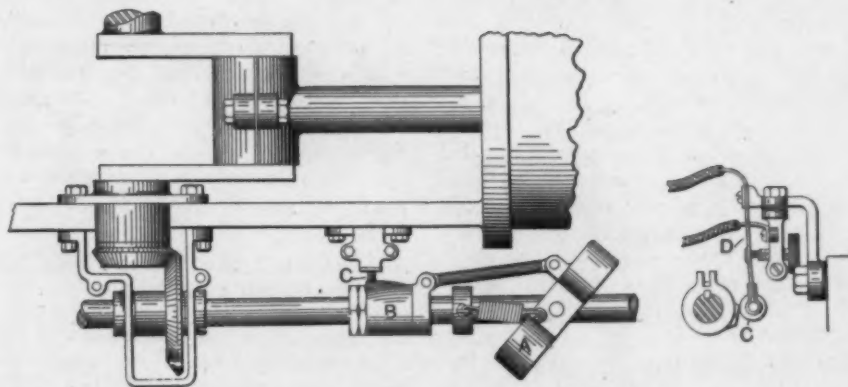


Fig. 8—GOVERNOR ON IGNITION.

to the latter, advantage is taken of the shape of the connecting rod, which is drop forged of H-section. The top of the rod is closed in for part of its length by a sheet copper cover, with a slit in it, through which the oil is delivered drop by drop. The motion of the rod then carries it backward to the small end and to the wrist pin.

To lessen the mechanical vibration as much as possible the cranks are counter-weighted; but a further gain in smoothness is obtained by the use of the Packard spring transmission between the flywheel and clutch. This is substantially the same mechanism that was shown in *The Automobile* of July, 1901; but the clutch is new, and is shown in section in Fig. 9. Here *A* is the flywheel hub, keyed on the engine shaft, and *B* is the hub, loose on *A*,

but retained by the ring shown, of a spider with three arms *C*. The flywheel rim has three lugs *D*, through which runs a split ring *E*, on which are strung the several helical springs (not shown) bearing between lugs *D* and the arms *C*. Thus the driving force of the engine and the impulses of the explosions are transmitted from the flywheel to arms *C* through the springs, which serve as cushions. Articulated somewhat loosely with arms *C* is a disk *F*, turning freely between two other disks *G* *H*, of which *H* is keyed to the primary shaft *I*, and *G* is keyed loosely on *H*. Two dogs *J*, carried on a collar threaded on *H*, and adjustable by screwing, are acted on by the spreader *K*. In the position shown they force disk *G* tightly against *F*, and *F* against *H*, gripping the three solidly together. When

released by withdrawing *K*, the disks are separated by the small springs shown. From the looseness of the connection between *C* and *F*, it follows that exact alignment between engine and gear shafts is not necessary, which is an important point in the successful working out of any machine where the engine and gear case are separately mounted as they are here.

This spreader *K* is operated through bell crank *I*, Fig. 3, by the lever *J*, Fig. 3, which in the forward half of its motion releases the clutch and applies the single acting brake band on the drum *L* (Fig. 9).

The bell crank is not directly connected to the rock shaft carrying the lever, but by means of a trip mechanism, simple to look at but not easy to illustrate, is disconnected from the lever as soon as the clutch is released, and picked up again when the lever, coming backward, has released the brake. The reason for this seemingly superfluous detail is doubtless to be found in the limited room on shaft *I* for free motion of *K*.

The planetary speed changing system of model C, giving two forward speeds and one reverse, has been discarded for the more efficient sliding gear system, with the addition of an intermediate speed. Three forward speeds and reverse are operated by a lever working in an H-slotted plate, much as in model C. Taking the inner slot first, the backward motion engages the reverse and the forward motion of the first speed. In the outer slot the backward motion gives the second and the forward

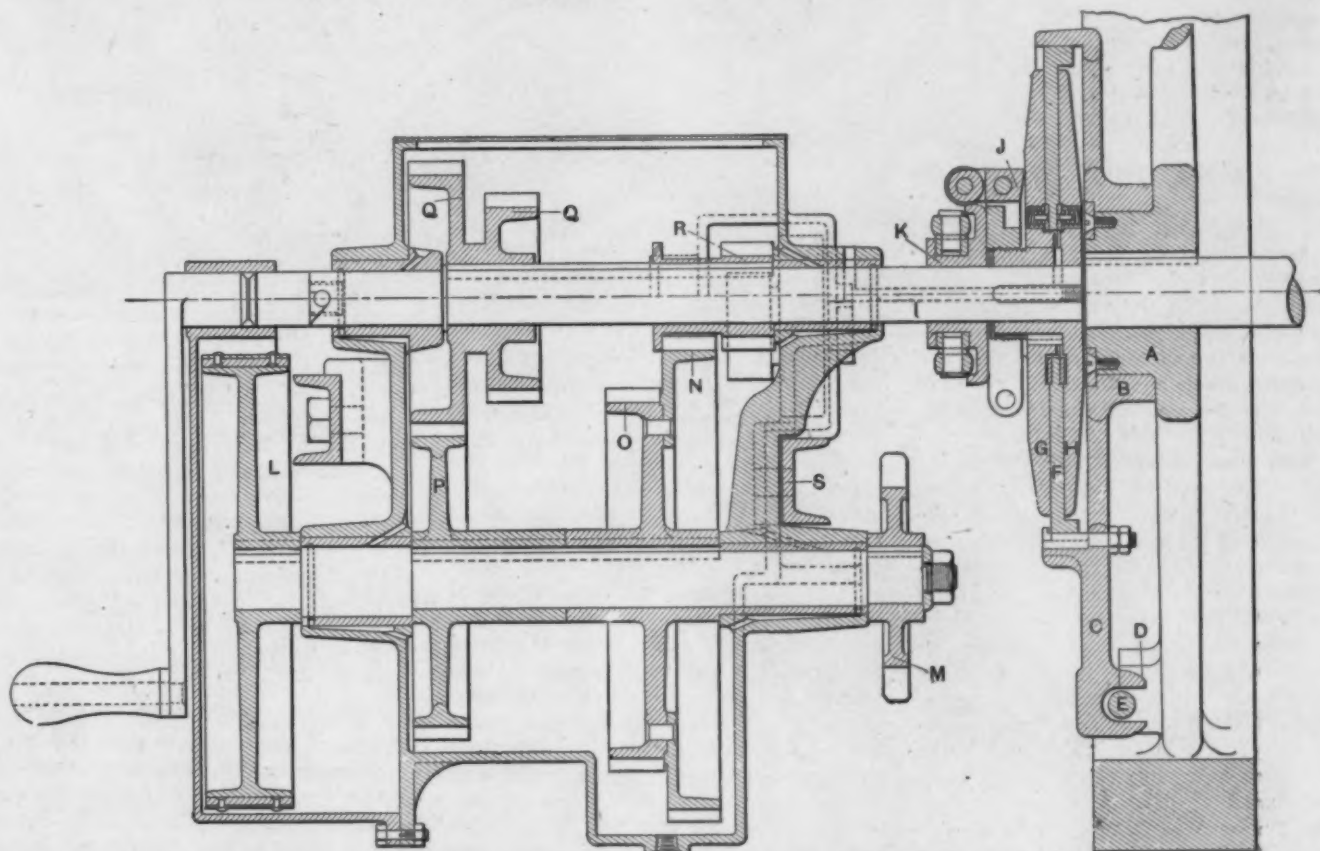


Fig. 9—CLUTCH AND SPEED CHANGE GEAR MECHANISM OF PACKARD CAR.

ward motion the third speed. These motions involve the use of three slides, two in the inner slot and one in the outer, and the slot is modified to permit the lever to pick up either one of two pins connected to the reverse and first speed slides, respectively. Looking again at Fig. 9, *M* is the sprocket pinion, *N* the gear giving the first speed and reverse, and *O P* the second and third speed gears, respectively. The latter two are engaged by the shifting of the double gear *Q* by means of the bell crank *K* (Fig. 3), the hand lever being then in the outer slot. To engage the first speed, *Q* is shifted to its neutral position, and pinion *R* meshes with *N* through bell crank *L* (Fig. 3). For the reverse *R* is restored to the position shown in cut and a double gear on an intermediate shaft, not visible in Fig. 9, is shifted through bell crank *M* (Fig. 3), into simultaneous mesh with *R* and *N*.

The lubrication of the shaft bearings of the gear case is somewhat more carefully provided for than Fig. 9 would indicate, the gear case having a hinged cover, in the under side of which are carried pockets to catch the oil thrown off from the gears on shaft *I*, which oil is then carried by tubes to shaft bearings. This is probably as well as can be done without providing entirely separate lubrication for gears and shafts, which the writer considers to represent the best practice to-day.

Contrary to usual custom, the rear hub brakes are made double acting and are operated by a pedal under the left foot. The rim brake used in model C has been discarded for a more conventional form of band brake whose character may be seen without much difficulty in Fig. 1. These brakes are equalized through a flexible wire cable running through the tubular rock shaft by which they are actuated.

Doubtless the primary reason for this radical transposition of the most frequently used organs of control—the clutch and regular brake on the one hand, and the emergency brake on the other—from the French practice of operating the first two by related pedals and the third by a hand lever, is to be found in the fact that the right foot is in this, as in the earlier Packard cars, occupied with the engine control. It may be, however, that the makers prefer on general principles to take advantage of the powerful muscles of the thigh for applying the emergency brake, and that their experience with the operation of the first speed and service brake by the backward and forward motions respectively of the change speed lever in the model C car satisfy them of the practicability of extending the same principle to the use of a separate clutch and brake hand lever. Certainly there is, in the abstract, much to be said in favor of foot operation for the emergency brake, though the writer must confess to thinking that the muscles thus called into play are less

profitably employed in regulating the throttle, and to a feeling that the operator's right arm may sometimes be a trifle overworked.

As was above intimated, the cooling water is circulated by a pump on the 2 to 1 shaft. The gasoline tank and the water tank are nearly side by side, both being above the level of the engine, and the former being provided with a gauge glass. The circulation is from the tank to the cooler, back to the pump, then to the engine jacket, and back to the tank. As the tank is higher than the pump, the latter can never go dry while standing, but this is partially offset by the fact that the pump when running has to suck the water against the friction of the cooler and rather long piping. The piping, however, is of unusual size and should offer but little resistance.

The vaporizer used this year is not

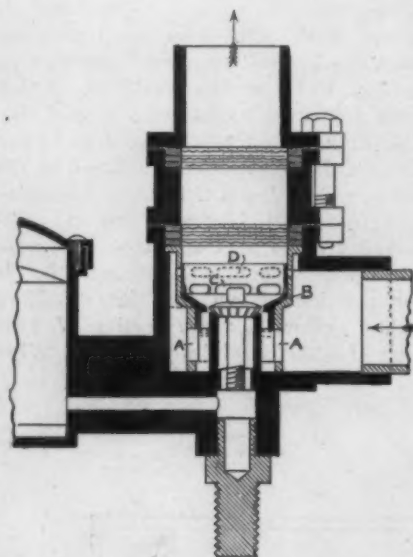


Fig. 10—PACKARD VAPORIZER.

greatly changed from that used in the model C, which is illustrated in Fig. 10. Air is drawn in at the apertures *A A*, and, in passing upward, it lifts the loose valve *B* to a greater or lesser height, dependent on the amount of throttling at the inlet valve and the velocity of the stream. Consequently the apertures *C* in this valve are made to register more or less closely with apertures *D* in the surrounding wall, through which additional air is admitted to dilute the stream, the theory being that a strong stream would otherwise suck a disproportionate amount of gasoline. The principal change from this vaporizer is to provide a shutter around apertures *D*, which may be opened to a greater or less extent by the operator, in order to regulate the diluting stream for different grades of gasoline. The float chamber of the vaporizer is provided with a cover so attached as to be readily removable, when the float and needle valve may be removed at once to clean away any dirt that might lodge in the valve.

The minor specifications include individual seats as the regular equipment, 34-inch wheels with 4-inch single or double tube tires, and a 1 1/2-inch chain. The gearing regularly supplied give speeds of 10, 20 and 30 miles per hour. The weight of the car with tonneau and all supplies is approximately 2,600 pounds.

AUTO COACH SERVICE IS PROFITABLE IN CHICAGO.

Special Correspondence.

CHICAGO, Jan. 10.—A little more than a month ago what may, with some propriety, be called an automobile street car service was started in Chicago. The route covered is only a trifle more than five miles for the round trip, the time consumed per trip being fifty minutes, allowing for short stops at either end. The service was started with but five cars in commission, running at ten-minute intervals, but at the end of the first month seven cars are in use, running a trifle more than seven minutes apart.

As this is believed to be the first notable effort looking to automobile competition with street cars in the heart of a large city, the following data secured from the manager of the American Motor Coach Co., which is operating the line should be of interest.

DATA OF SERVICE AND COST.

The average number of passengers carried per coach on each round trip is a fraction over twenty-three, and each coach makes an average of eleven round trips per day, making a total of 253 passengers carried per day per coach.

The gasoline consumption varies with weather conditions, the lowest amount consumed per day per coach being eight gallons, and the largest amount twelve gallons. Other expenses attached to the actual operation of the coach from day to day, such as carbide for lights, lubricating oil, washing, rental, incidental repairs and wages of operators have been carefully figured, but are not deemed of particular interest. However, the average net profit per day per coach is about \$5.35, which seems exceptionally good for a new venture, but the business enjoyed may prove to be above what may be expected regularly for two reasons: First, the novelty of the thing may have added many nickels to the receipts, and second, the first three weeks of business were those immediately preceding the holidays. Perhaps the month of January will furnish a better index of the real earning capacity of the coaches.

COACHES COMFORTABLE AND SAFE.

So far the line has been operated with a surprisingly small number of accidents or breakdowns, there having been but two instances when it was necessary to transfer passengers to one coach from another disabled one.

In one important respect the new coaches are a welcome innovation in Chicago passenger service; they are kept at a comfortable temperature. This added comfort to its patrons costs the new corporation nothing, however.

For the second month the route has been somewhat lengthened, the northern terminus now being at the Plaza Hotel, corner of Clark Street and North Avenue, while the southern starting point is at the corner of State and Adams Streets, in the heart of the retail shopping district.

This important venture will surely be watched with interest not only by the automobile trade and enthusiasts, but also by the great general public which is dependent on public street conveyances for

COMBINATION AUTOMOBILE HOSE AND CHEMICAL CART.

An automobile hose cart and chemical wagon will be exhibited in New York during the week of the Madison Square Garden Show. The new vehicle arrived recently in Newark, where it was given a public trial with fire commissioners and a representative of the Fire Underwriters' Association on board.

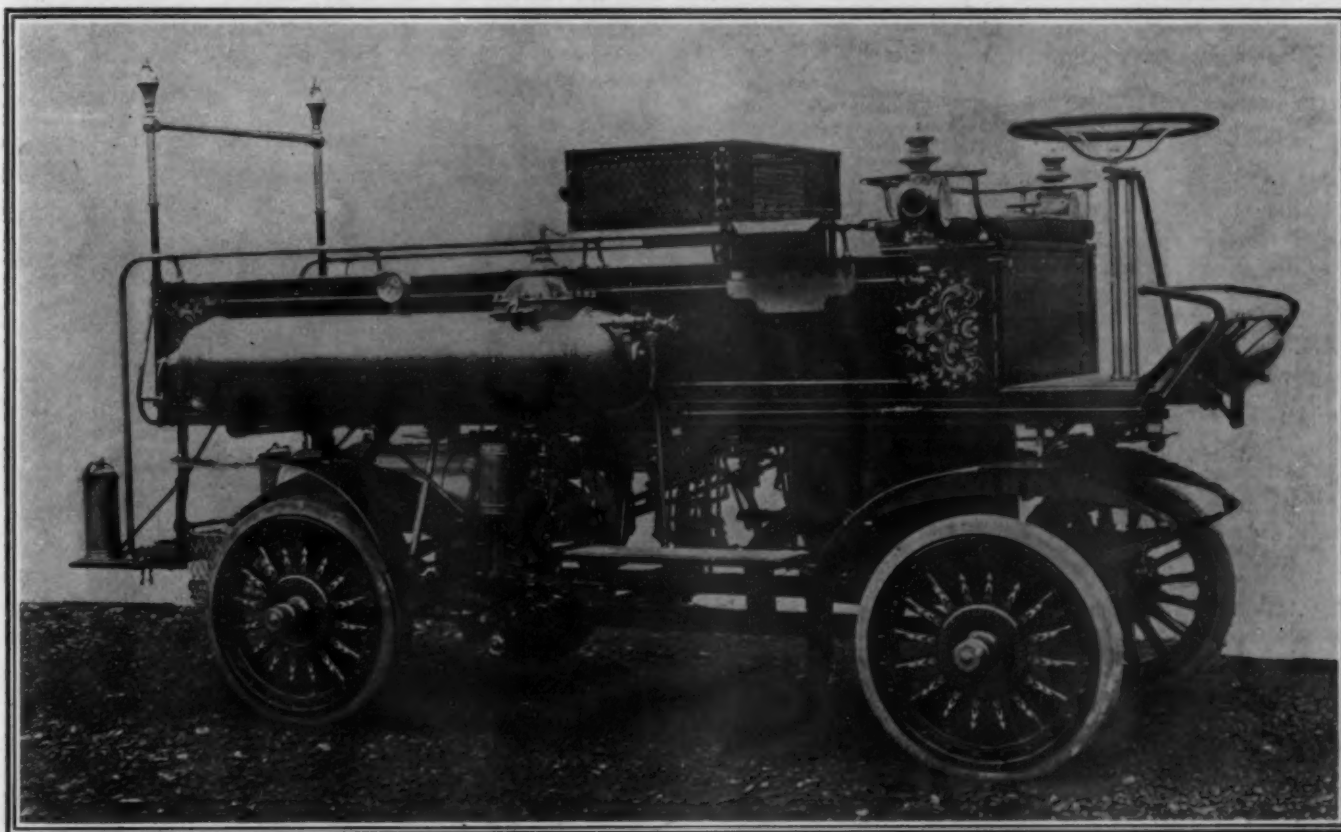
Last week the wagon was brought to New York city, where it was housed with the Sidney Bowman Automobile Co.

The combination wagon was built by the International Fire Engine Co., of Elmira, N. Y. It is built with an iron body on a steel frame, and weighs about 7,000

two water pumps on the cross-head, besides which there are auxiliary steam and water pumps back of the boiler.

The boiler is placed well forward just back of and below the driver's seat. It is 36 inches in diameter and of the water-tube type. It is fitted with a water gauge and three try-cocks. The box-like projection shown on the side of the body and back of the seat is one of the baffle ends of the smoke flue, there being one on each side of the vehicle. Two mufflers and two exhaust pipes complete the equipment in that direction.

The water and gasoline tanks are placed under the wagon bed between the rear springs. Air and steam gauges are placed on the dash in full view. The chain ad-



STEAM PROPELLED COMBINATION HOSE AND CHEMICAL CART, BUILT IN ELMIRA, N. Y.

transportation between the home and the office, retail stores and places of amusement.

Expert Opinion on Oiled Roads.

"I consider that the methods of oiling roads, as instituted in the California district, ranks in importance in the history of highways with the discovery of the 'macadam' system of road making," is the opinion expressed by James W. Abbott, special agents of the Bureau of Public Road Inquiry for the Rocky Mountain and Pacific Coast division, who is now, at the direction of Secretary Wilson, of the Department of Agriculture, making investigations on the subject.

pounds. The two axle reaches are of I beam, and the body is supported on the axles by four full elliptical springs, placed fore and aft. Carried in the main body and in the metal box above the center of the body, are 1,000 feet of 2 1/2-inch cotton hose, ready to attach to an engine. On each side of the body is an 80-gallon chemical tank of copper. These are piped to 150 feet of chemical hose, carried in a wire basket placed under the rear of the body, forward of the back running board.

The wagon is driven by two double-cylindered 8 horse power steam engines, with link motion, each placed under the chemical tank and driving independently through a chain to the rear wheel on the same side, with which it is in line. Each engine has

justing rods reach from the rear axle to yokes connected to and back of the axle bearings of the engines.

The vehicle is steered by wheel connecting to the knuckles of the front wheels by a ball-jointed rod ending in a worm on the cross rods. The steam throttle is controlled by the small wheel above the center of the seat. Under the steering wheel is the control lever working through a separate standard. The foot brake acts through shoes on the rear tires and is possible of manipulation from any position on the seat. The foot pedal is in the form of a long rod extending clear across the dash and well clear of it. Street signaling is provided for in a foot gong and a large steam whistle.

Air-Cooled Multi-Cylinder Motors.

New Efforts for Dispensing with the Cooling System Follow in the Wake of Improved Carburation and Throttling Methods.

When air-cooled gasoline motors were tried in automobiles and found wanting in sizes developing more than two to two and a half horse power per cylinder, the experiments were made with high-speed motors with high compression, because at the time motors of that design were considered the only kind adapted for automobile work. As throttling of the explosive mixture was not developed to the degree of reliability reached to-day, the motors were operated at approximately constant speed and consequently with excessive generation of heat. Ignition was not so reliable as now and there were difficulties in feeding the gas equally to more than two cylinders; so practice favored the single or double-cylinder motor, and when the demand for higher-powered cars

give considerable speed for the light vehicle at a very moderate motor speed.

When Knox in this country introduced air-cooling in a single-cylinder 5 horse power motor many considered it a case of rushing in where the angels feared to tread; but their fears have been disappointed. And now the conditions which affect the temperature of motors have been changed on so many essential points that a revision of the grounds for the former rejection of air cooling seems to be in order.

Motors of seven hundred to eleven hundred revolutions have taken the place of those spinning their shafts at twice the speed, and ninety per cent. of the time they are in operation they are run even much more slowly under the throttle and

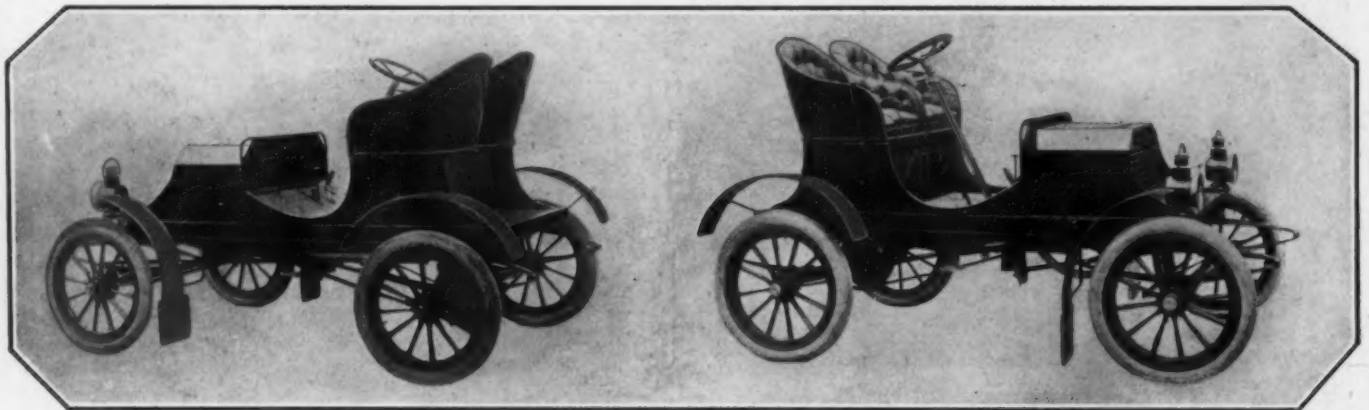
cent Reliability Contest from New York to Boston and return.

Radically different from other automobiles as this vehicle is in combining the four-cylinder type with air-cooling, its makers have yet shown much conservatism in limiting the size and power of the motor, so that each cylinder does not develop more than 2 1-2 horse power at full speed and full charges while it naturally has a larger radiating surface than the small high-speed motors of the same power and heat generation for which air-cooling even in former days was found practicable.

The subject being of general interest as illustrating one of the possible types of the future, John Wilkinson, the Franklin Company's mechanical engineer and designer, gives in the following a brief description of the vehicle system adopted and an explanation of the principles of air-cooling.

EXPLAINED BY THE DESIGNER.

With its distinctive features of four-cylinder air-cooled, slow speed, vertical



THE FRANKLIN 10 H.-P. LIGHT CAR WITH AIR-COOLED MOTOR.

became general this led to the adoption of cylinder sizes which called for energetic cooling. Under those circumstances air-cooling was practically rejected for automobiles, and the rejection still holds valid and final with those who have failed to notice that several of the reasons for the unfavorable finding have disappeared.

A few constructors still held on to the possibility of air cooling however. Henriod in France used air-cooled two-cylinder motors up to 12 horse power for several years before he surrendered—more for commercial than technical reasons. This early developed throttling system gave him fairly good results. Subsequently Truffault drove his 12 horse power, single cylinder freak *voiturette* on the same principle with considerable success, driving always on the high gear so as to have very little heat generation when going slowly and very much air cooling when going fast. The reduction ratio of his transmission mechanism was arranged to

brake. The timing of the spark has taken second place for reducing the power development. New gear ratios have changed the relations between motor and vehicle speeds. Three and four cylinder constructions have been rendered thoroughly practical by improved ignition and fuel feed methods, so that smaller cylinders may be used in cars of the high power usually demanded by the public. The high power in itself, and especially when combined with reduced weight of the cars, makes it necessary to run motors much below their capacity most of the time, thereby greatly reducing the heat per unit of radiation area.

To exploit these changed conditions in the most radical manner in favor of air-cooled multi-cylinder motors in automobiles has been reserved for the H. H. Franklin Company, of Syracuse, whose vehicle with four-cylinder air-cooled motor has now been before the public for a half year, one of them participating in the re-

motor placed in front and driving direct to the rear axle by means of chain, the Franklin light roadster machine presents food for thought in the automobile world.

It is not of mushroom growth, but, on the contrary, represents several years of preliminary work on the part of its designers and builders. With its noiseless exhaust, compensating carbureter and extreme throttle control it represents features which have only just begun to take prominence in the foreign automobile field. The four cylinder engine is of 3 1-4 inch bore by 3 1-4 inch stroke, with valves directly in the head. No valve chamber being present, the internal surface exposed to the heat of combustion is reduced to a minimum, giving at once the least heating effect and the greatest thermal efficiency. At 1,000 revolutions the motor gives more than 10 brake horse power in ordinary service when called upon to do so. At this speed of engine or about 540 feet per minute piston speed (the true measure of

an engine's speed) the vehicle runs 20 miles per hour.

The working speed of the engine ranges between 300 and 1,600 revolutions per minute, corresponding to six to 32 miles per hour on the high and two to 10 2-3 on the low speed.

Both valves, integral with their seats and springs, are easily removable by unscrewing two 5-16 inch cap screws and can be replaced by duplicates without recourse to grinding or fitting of any kind.

Lubrication is by forced pump feed into base of engine, regulated by speed of engine.

The running gear consists of a tubular front and rear axle, four elliptic springs and an angle iron frame, the top of the rear springs being hung on a pivot and the axle connected by two adjustable reach rods to the frame. The engine is mounted on two cross angle irons. The rear axle is separable at the differential and both main gears of the same are keyed and brazed to the driving shaft.

The transmission gear is enclosed in an oil tight case bolted to the end of the engine base and is therefore not subject to misalignment. It is a modified form of the sun and planet gear with only one internal gear. The entire gear within the case is without bolts or nuts and by removal of the case every part can be instantly removed for examination.

Another departure from the standard practice is the use of only one jump spark coil for four cylinders.

PRINCIPLES OF AIR-COOLING.

The fundamental principle of cooling a gas engine is to keep the cylinders of the walls of such temperature that at the speed the engine is run premature explosions will not occur, and so that the enter-

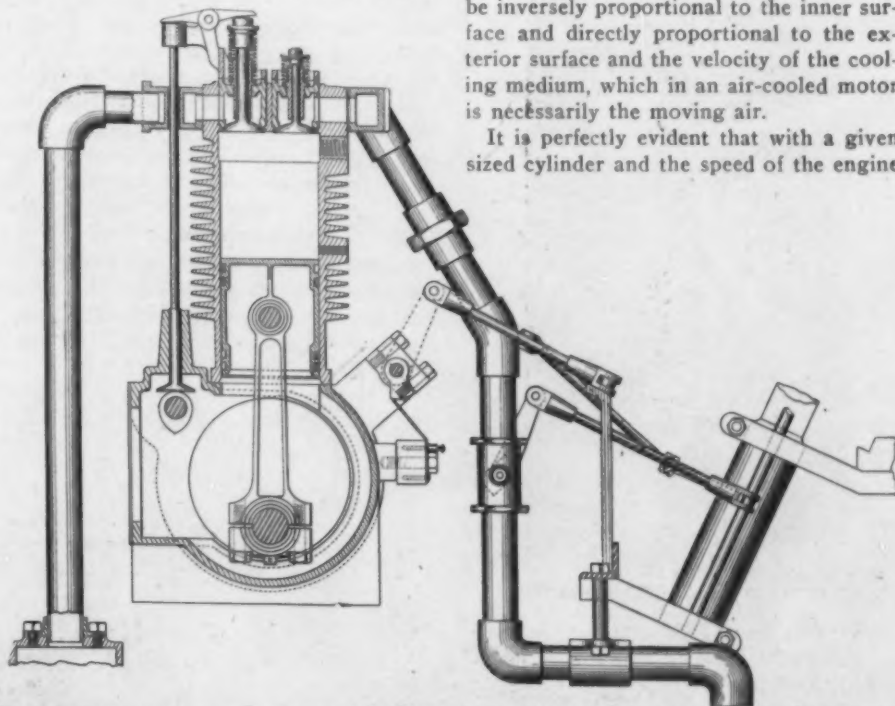
ing charge will not be too much expanded by the absorption of heat from cylinder walls so as to reduce the power of the engines.

It is also necessary that the temperature should not be so high as to destroy the effects of the lubricants. This latter point

greater the heat transmitted to and through the walls of the cylinders. Therefore, the outside cooling surface of any engine, air or water-cooled, should be in proportion to the amount of interior exposed surface.

The cooling effect will in general terms be inversely proportional to the inner surface and directly proportional to the exterior surface and the velocity of the cooling medium, which in an air-cooled motor is necessarily the moving air.

It is perfectly evident that with a given sized cylinder and the speed of the engine



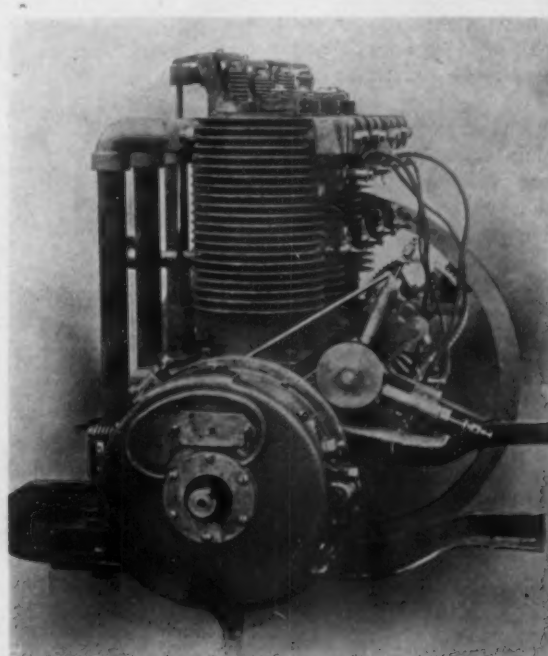
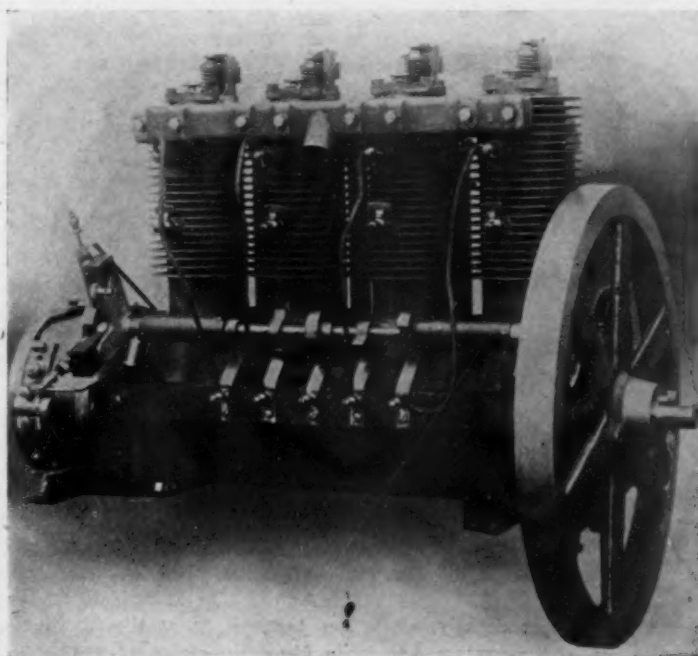
FUEL FEED, THROTTLING SYSTEM, CYLINDER LUBRICATION AND VALVES IN FOUR-CYLINDER AIR-COOLED MOTOR.

however in practice has not been found to be of any particular difficulty to overcome.

Every gas engine has a certain internal surface exposed to the heating effects of the combustion therein and the greater the internal surface of the engine the

1,000 revolutions and the speed of wagon at 20 miles an hour, the cooling effect will be much greater than if the speed of the wagon were only 10 miles an hour with the same speed of the engine.

This is a vital point. In the early types of air-cooled motors as applied to tricy-



FOUR-CYLINDER AIR-COOLED MOTOR, FRONT AND END VIEWS, SHOWING TRANSMISSION GEAR BOX ON END OF MOTOR SHAFT.

cles, the motor was made to travel at the speed of 1,800 to 2,000 revolutions while propelling the vehicle 18 to 20 miles an



ONE OF THE CYLINDERS.

hour. This gave satisfaction as long as the speed of the motor and vehicle could be kept up, but when necessary conditions caused the motor to be slowed down, the entering charge absorbed so much heat from the cylinder walls that the power was greatly reduced from this expansion and very often premature explosions were the result.

Also if the engine was required to be started up after stopping for a moment, it was found to be almost impossible as the speed of starting was not sufficient to overcome the back explosion due to the high heat of the cylinder walls.

It will also be noted that those engines were carrying practically their maximum load.

In this comparison the advantages of the Franklin machine consist in less internal surface, more external surface, less load on the engine and greater speed of the cooling medium.

In as much as the heating walls will be efficient for cooling at a reasonable distance from the source of heat, it is impos-

size of the air-cooled cylinder with natural draft for cooling is limited, and it is therefore necessary to increase the number of cylinders to three or four to obtain the desirable power for an automobile. In the writer's opinion, four cylinders give the ideal condition of gas engine construction. Such an engine can be satisfactorily worked with one suction pipe and carbureter, one muffler and one spark coil, and therefore no more complications in regard to these appurtenances than with the single cylinder engine. It is also possible to use a vertical engine placed in the front of the wagon where it should be both for reasons of convenience and for the access of air for cooling.

The lubrication of the engine is one of the most important problems connected with it and it can be carried to a high degree of satisfaction by combining the

FORFEITURE AND RETURN OF GORDON BENNETT ENTRANCE FEES.

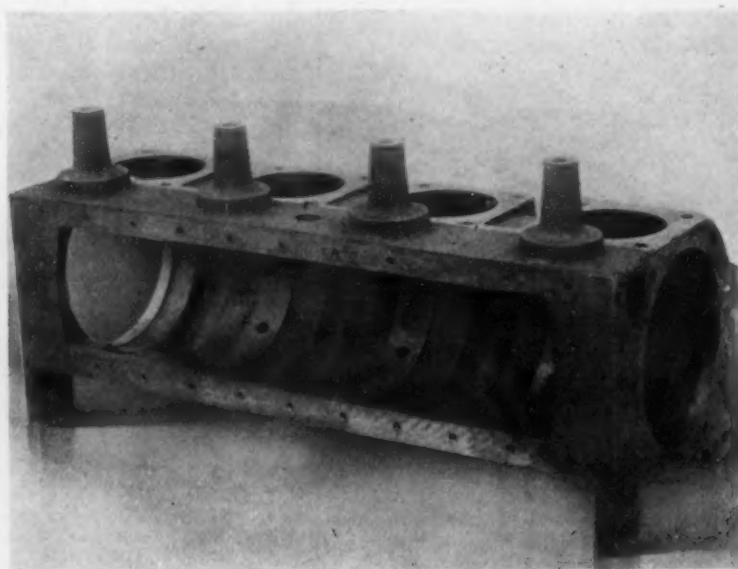
Supplemental conditions to the rules governing the Gordon-Bennett Cup Race have been issued by Chairman George Is-



CONNECTION ROD AND BEARING.

ham Scott, of the racing committee of the Automobile Club of America. There are six of these, those which have not already been published providing that:

"Any entrant who after being nomin-



CRANK CHAMBER OF AIR-COOLED MOTOR

splash system with the forced feed pump supplying oil according to the speed of the engine.

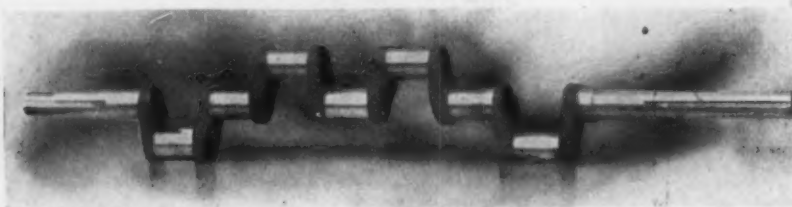
The design of engine giving the least internal surface calls for the placing of the valves in the head, and this position of the valves is therefore adopted, being also easy of access. If from wear the timing of the exhaust valves becomes slightly wrong, the lifting rods can be removed in

ated for the Cup Race by the committee, does not start, shall forfeit his entrance fee of \$600;

"If three entrants are nominated to take part in the Cup Race, each entrant shall have two-thirds of his entrance fee (after deducting his proportion of the expenses incurred in holding the race) returned to him, provided he starts in the race;

"If two entrants only are nominated, each of such entrants shall have one-half of his entrance fee (after deducting his proportion of the expenses incurred in holding the race) returned to him, provided he starts in the race."

William E. Scarritt, president of the American Automobile Association, has been selected to act as toastmaster at the annual banquet of the National Association of Automobile Manufacturers to be held on January 23 at the Waldorf-Astoria in New York during the Madison Square Garden show.



CRANK-SHAFT OF FRANKLIN 4-CYLINDER ENGINE.

sible to make a large engine with as much cooling surface proportionately as a smaller one. It therefore follows that the

a very few minutes and forged out slightly longer so as to bring them to the correct time.

Paris Show from English View.—II.

British Expert Continues Analysis of Mechanical Features at the Grand Palais—Mainly About Transmission Gear Systems.

Staff Correspondence.

LONDON, Jan. 3.—Returning to England I find that the question of mechanically actuated valves, so strongly emphasized at the Paris Show, is causing a good deal of stir owing to the adverse comments of the Napier interests, who have apparently pinned their faith to the multiple-automatic type. At the Grand Palais it was noticed that the adoption of the positive valve action by the French firms was not so uniform as to establish the details of the system. With some a single lay shaft is employed and the exhaust and induction valve chambers are cast side by side on one side of the cylinder head, while on the other hand the Peugeot practice of last year, namely, the practice of keeping one set of valves one side of the cylinders and the other set on the other, is still followed. Personally I prefer the latter, as likely to cause far less deformation of the cylinders from expansion due to heat in working, and notwithstanding the added complication, if complication it can be called, of the additional lay or cam shaft. But, however the valve gear is arranged, there is little doubt that the mechanically actuated induction valve has come to stay, and the public being one well bitten in with the idea that valves so worked are the "proper thing," they will cease to regard anything else no matter what is advanced in favor of the automatics.

BENZ GIVES UP BELT.

Old time Benz car drivers must have received something of a shock to find that the old Mannheim House had at last discarded the horizontal motor and the belt-drive in favor of a vertical engine, toothed wheel change speed gearing and propeller shaft drive to a live rear axle. The old German house were forced to this step or to something very like extinction.

Among so much blind Mercedes copying, I did not notice that the leading houses were falling over each other to imitate the Mercedes mechanical clutch, of which so great a song was made in London when Mr. Harmsworth's 40 horse power Mercedes was stripped at the Agricultural Hall last year for the benefit of English automobile manufacturers. In nearly every case the ordinary double cone friction clutch in more or less modified form is used, but in the Clement cars I noticed what to my mind is one of the best forms of mechanical clutch I have yet come across. It is very largely modeled upon the Mercedes pattern of 1901, but with important modifications. The engine flywheel has the usual heavy rearward overhanging flange, but this is not

coned on its inner periphery as usual. Fast on the clutch shaft is keyed a star wheel having four arms each recessed on their rear faces to form guides for four clutch arms with flat segmental ends, making parallel contact with the inner periphery of the flywheel. These clutch arms are each held independently up to their work by stout tubular arms running to a collar loose on the clutch shaft, by the actuation of which, through the foot pedal in the usual way, the segmentally ended clutch arms are withdrawn from driving contact with the flywheel, the clutch arms being drawn toward the center of the shaft and sliding in the guides formed by the arms of the star wheel fast on the clutch shaft. The tubular arms by which the segmental clutch arms, or blades are actuated are each surrounded by a strong special spring, which serves to keep its own clutch arm up to driving contact with the flywheel. It will thus be seen that the driving clutch is practically divided into four independently gripping portions so that the four-fold grip is unaffected by wear or any temporary torsion or deformation of the shaft lines. Oil gives no trouble with this clutch, indeed it needs lubrication to promote the necessary slip when getting under way. I am credibly informed that it is possible to start the Clement car fitted with this clutch on her third speed without shock or stopping or straining the engine. This clutch is the chief feature of the Clement cars shown, save that their engines are now fitted with mechanically actuated induction valves and variable magneto ignition. The current is provided by a magneto with rotating armature.

DISKS TAKE PLACE OF CRANKS.

Perhaps a feature of these fine engines which ought not to be passed over without a word, is the care taken to balance them. The crank chambers are made with internal bridges to carry bearings between each connecting rod, cranks are dispensed with and crank disks with crank pins properly balanced employed in their stead. Partinium and bronze are largely coming into use for the crank chambers and gear boxes among the French makers. There is a decided tendency to drop aluminum in favor of the above mentioned alloys, although they are slightly heavier. What one looked for in vain more or less in the Paris Show was anything in the nature of a fresh departure or improvement in transmission gear.

The 8-cylinder engine staged by Messrs. Charron, Girardot and Voigt, by the use

of which these sanguine folks hope to do away with change speed gear altogether can hardly be considered in this light, but something approaching novelty was found in the "Louet" change speed gear, the constructional details of which can be grasped by reference to the accompanying diagram. The sliding sleeve with its train of toothed wheels known in French parlance as the "*train balladeur*" is replaced by a frame sliding laterally in guides in the gear box. This frame carries pairs of gear wheels for five speeds, the fifth being twin-meshed wheels for obtaining the reverse speed. The sliding frame is actuated by a gear lever set at the driver's hand in the usual way, and when the frame has been moved so as to bring any desired combination of gear wheels into mesh, the frame is locked in position by a nosed pawl falling into a slot prepared for same in the side plate of the frame. The first result of moving the gear lever to change speed is to raise this pawl from its locking position ready to lock up again so soon as the next set of wheels is engaged. Gear inspection and replacement is also rendered a very simple matter by this system. The shaft shown in section above the box is the clutch shaft and that below the propeller shaft. The qualities of this method of mounting change speed gear remain to be seen, but the least that can be said for it is that it presents some originality.

TWO YEAR OLD NOVELTY RECOGNIZED.

Some further originality, or at least a departure from the general practice, was shown in the arrangement of the engine and gear box fitted to the light cars staged by the Société Anonyme des Automobiles "Motobloc." In these cars the 2-cylindered engine is placed under the motor bonnet, on the right of the frame, the breeches of the cylinders being pointed forward, while the cylinders themselves rake backward and downward at an angle of about 45 degrees. The crank chamber and gear box are all in one, running right across the frame with the fly-wheel outside on one side and the double cone friction clutch on the other. The solid clutch shaft is connected to the end of the engine shaft by a "*tourne-avis*" joint and runs right through to the outside of the gear box, where it carries the female member of the clutch. The male member is mounted on the projecting end of a sleeve squared within the box to take the sliding sleeve, carrying change gear wheels meshing with toothed wheels on a secondary shaft above. The drive to the live axle upon which is mounted the differential gear is by a heavy large pitch roller chain. Thus all the shafts rotate in parallel planes and the transmission of the drive nowhere turns a corner. I am bound to say that this method of drive particularly appeals to me and I have been told that the next Mercedes which is to set all the

French makers "gibbering" will be on this system, but with vertical engines.

[The system described above is practically two years old, and cars of almost identical construction were exhibited at the previous Paris Show by Theo. Schaudel, of Bordeaux, a gunmaker. The "Moto-bloc" company succeeded to his business, but, so far as the writer knows, Mr. Schau-

Horizontal projection, 43.60 yards.

Vertical throw, 32.70 yards.

I have seen many motor-propelled fire engines, both in fact and on paper, but the above roughly described vehicle struck me as the most practical.

ACCESSIBLE EXHAUST VALVE.

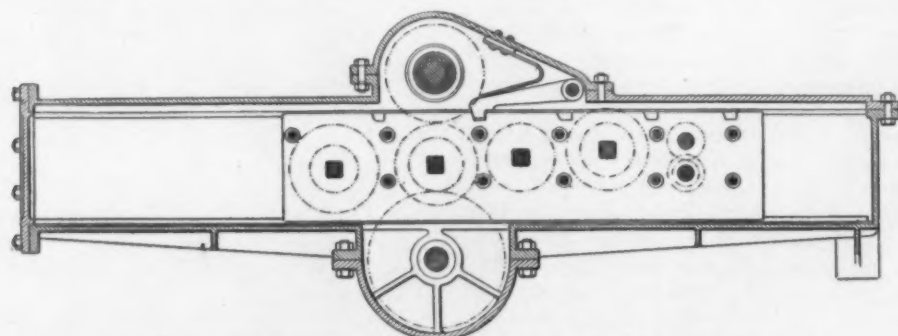
The difficulty of removing exhaust

in the valve stem. When the lifting rod is swung back, the end of the spring is easily withdrawn from the slot with a pair of pliers and the spring slipped down and the valve withdrawn through the valve chamber with the greatest ease.

(To be continued.)

NEAT CARRIAGE EQUIPMENT FOR TROPICAL COUNTRIES.

The Car, England's fashionable automobile journal, shows the illustration herewith reproduced of a Mors machine intended for use in British India and for which the carriage work was made by an English firm. The owner is C. Potter, of the Tenth Hussars, who also takes with him to India a $4\frac{1}{2}$ horse power Renault machine for lighter service. The touring car seems a remarkably handsome specimen of its class, and was designed with strict regard for the East Indian climate. The large tonneau body has extra high backs fitted with a very effective dust guard. The canopy, with side curtains, is supported on six very light tubular standards and has a double roof with air space which will effectually intercept the hot rays of a tropical sun. A glass screen in front protects the driver against wind, dust and driving rain. The upholstery of the car, which holds six persons, is in pigskin, which is particularly adapted for hot climates, and it is the owner's intention to replace the pneumatic



LOUET CHANGE SPEED MECHANISM WITH SLIDING GEAR FRAME.

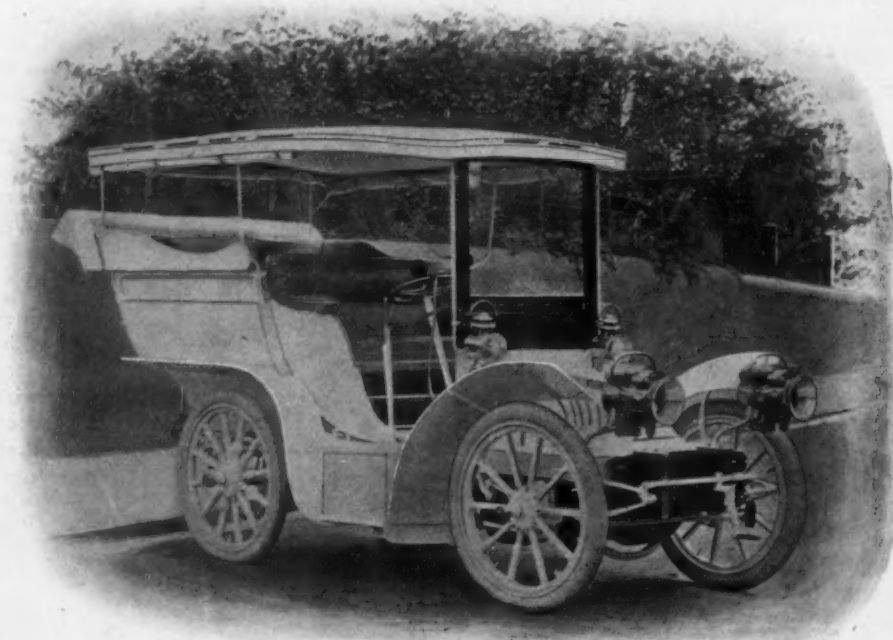
del is still at the head of this manufacture. —The Editor.]

GASOLINE MOTOR FIRE ENGINE.

A very fine example of a motor fire engine was shown by Messrs. A. Thirion et Fils, of Paris, and if it fell under the eye of the obstinate and pig-headed naval man who poses at the head of the London Fire Brigade, it must have made him feel very foolish when he recalled the abortions for which he was responsible and of which you lately produced counterfeit presentments in your pages. The center of gravity of these machines was kept as low as possible. The frame was in U section steel, made as light but as rigid as possible, and carried on the rear and steering axle through the medium of semi-elliptical springs. The petrol engine was of the horizontal 2-cylinder opposed type, giving 20 horse power, electrically ignited and serving to propel the machine when en route to the scene of action and to pump the water upon the flames upon arrival. It was fitted with a Panhard type of change speed gear, giving three speeds forward and one reverse, which were actuated through a double magneto clutch, serving when engaged with the right-hand female clutch to drive the vehicle and when with the left hand member to work the pumps. The accumulators providing current for the electrification of the magnetic clutches. The 3-barrelled double-acting water pumps were set horizontally across the vehicle. Seats were provided for three firemen and standing room for two more in addition to the driver, who had entire control of the conduct of the vehicle. The speed of the machine on the level was equal to 14 miles per hour, while the effect and delivery of the pumps when in action was as follows:

Delivery of water per hour, 8,800 gallons.

valves on combustion engines is well known to users of gasoline cars so that reference to a neat and handy arrangement fitted to the "Pipe" engines may not be amiss. The exhaust lifting rod is forked over the cam shaft being lifted by the cam striking a stud projecting from its side. The rod is cupped at its upper end to receive the lower rounded end of the exhaust valve stem, and upon the latter being raised against the spring the lifting rod can be swung clear. The irri-



A 15-HORSEPOWER MORS EQUIPPED FOR USE IN INDIA.

tating cotters and cups for carrying the lower ends of the exhaust valve springs are done away with and the lower end of the spring itself is turned through the slot

tires with Sewell's suspensory tires, which are said to have given satisfaction in recent tests, while rubber tires suffer considerably from softening in tropical climates.

Complete Vehicle Exhibits at Madison Square Garden.

Tables Listing Electric, Steam and Gasoline Motor Vehicles with Reference to Styles, Seating Capacity and Prices.

(For Additions See Note under Gasoline Motor Vehicle Table.)

ELECTRIC VEHICLES.

MANUFACTURER OR EXHIBITOR.	STYLE OF VEHICLE.	SEATS.			PRICE.						MANUFACTURER OR EXHIBITOR.	STYLE OF VEHICLE.	SEATS.			PRICE.					
		1 or 2	3 or 4	More than 4	Less than \$750	\$750 to \$1,000	\$1,000 to \$1,500	\$1,500 to \$2,000	\$2,000 to \$3,000	More than \$3,000			1 or 2	3 or 4	More than 4	Less than \$750	\$750 to \$1,000	\$1,000 to \$1,500	\$1,500 to \$2,000	\$2,000 to \$3,000	More than \$3,000
National Motor Vehicle Co.	Piano Box Runabout, Model 50.....	2				950					Rainier Co., (Continued)	Truck, 2 tons capacity.....									3,400
"	Piano Box, Model 65.....	2				1,000					"	Truck, 3 tons capacity.....									3,700
"	Bracket Front, Model 75.....	2				1,000					"	Truck, 4 tons capacity.....									4,000
"	Full Stanhope, Model 85.....	2					1,500				"	Truck, 5 tons capacity.....									4,400
"	Piano Box, Model 100.....	2					1,200				Centaur Motor Veh. Co.	Runabout.....	2			850					
"	Dos-a-dos, Model 110.....	4				1,250					Electric Vehicle Co.	Extension Front Brougham.....	4								
Ajax Mot. Veh. Co.	Runabout.....	2				850					"	Straight Front Brougham.....	2								3,500
Am. Auto. Storage Co.	Baker Stanhope.....	2						1,600			"	Rear-Driven Coupé.....	2								3,000
"	Imperial.....	2				1,300					"	Inside-Operated Coupé.....	2								2,800
"	Physician's Chapelate.....	1				1,200					"	Hansom Cabriolet.....	2			875					3,500
"	Baker Newport.....	2				1,500					"	Light Runabout.....	2				1,500	1,000		2,350	
"	Runabout.....	2				850					"	Victoria.....	2					1,800			
Rainier Co., Gen. Sales Agents for Vehicle Equipment Co.	Extension Front Brougham.....	4							3,500		"	Tonneau.....	4								
"	Straight Front Brougham.....	2							3,400		"	Special Service Wagon.....	2					2,000			
"	Hansom.....	2							3,500		"	Truck.....	2			950					3,500
"	Grand Victoria.....	3							3,500		Studebaker Bros.	Runabout, with Buggy Top.....	2				1,010				
"	Delivery Wagon, 1/2 ton capacity.....							2,400			"	Stanhope, with Stanhope, with Close Top.....	2				1,075				
"	Delivery Wagon, 1 ton capacity.....							2,600									1,150				

STEAM VEHICLES.

Manufacturer or Exhibitor.	Style of Vehicle.	SEATS.			PRICE.						Manufacturer or Exhibitor.	Style of Vehicle.	SEATS.			PRICE.					
		1 or 2	3 or 4	More than 4	Less than \$750	\$750 to \$1,000	\$1,000 to \$1,500	\$1,500 to \$2,000	\$2,000 to \$3,000	More than \$3,000			1 or 2	3 or 4	More than 4	Less than \$750	\$750 to \$1,000	\$1,000 to \$1,500	\$1,500 to \$2,000	\$2,000 to \$3,000	More than \$3,000
Lane Motor Vehicle Co.	Style "1".....	2					1,075				Locomobile Co.	Several 1900 Models.....				No detail	a giv en.				
"	Style "11".....	2					1,125				Country Club Car Co.	Touring Car.....	2			1,000					
Mobile Company	Special Runabout.....	2			850						Steam Carriage Co.	Touring Car.....	2				1,050				
"	Runabout.....	2			900						"	Trap or Dos-a-Dos.....	4			1,000					
"	Dos-a-Dos.....	4				1,100					"	Victoria Top Runabout.....	2				1,000				
"	Victoria.....	4				1,400					Hoffman Auto. & Mfg. Co.	64 h.p. Model A. Tonneau.....	2				1,200			2,500	
"	Coupé.....	9					3,000				Grant Bros.	Drop Front.....	4			850					
"	Light Surrey.....	4				1,325		2,000			Prescott Auto. Mfg. Co.	Box Front.....	2								
"	Touring Car.....	6					2,300				"	Touring Car.....	2				1,100				
"	Heavy Surrey.....	11					2,000														
"	Wagonette.....	2				1,085															
"	Wagon Delivery.....	3						2,300													
"	Wagonette Delivery.....	3																			

CLASSIFIED LIST OF COMPONENTS AND ACCESSORIES.

COMPONENT PARTS OF COMPLETE VEHICLES.

Centaur Motor Veh. Co.—Battery, wheels, brakes of elec. runabout.
 Duryea Power Co.—Ignition apparatus; speed gear, compact; brake, expanding and balance gear.
 Elmore Mfg. Co.—"Elmore" two-cycle motor.
 H. H. Franklin Co.—Four-cyl. air-cooled gas vehicle.
 Grout Bros.—Steam engines and boilers; gasoline and kerosene burners.
 Lane Motor Veh. Co.—Components of Lane steam vehicles.
 Locomobile Company.—Steam and gasoline models; full line.
 Mobile Company of America.—Engines, boiler, tanks, steel tip burner, combined water and air pump, low water alarm and water regulator, double acting brake.
 Motor & Gear Mfg. Co.—Parts of French pattern automobiles.
 Smith & Mabley.—Panhard motor and gears (perhaps).

CHASSIS WITH MOTOR.

Berg Automobile Co. (with Rainier Co.).—Chassis Berg gasoline vehicles.
 Locomobile Company.—Gasoline motor vehicle; price, \$3,200.
 H. H. Franklin Co.—Four-cylinder air-cooled gas vehicle.

Packard Motor Car Co.—Model K, gasoline vehicle.
 Central Automobile Comp.—15 H. P. Mors, gasoline vehicle.
 Autocar Company.—"Autocar," regular stock.
 Smith & Mabley.—Panhard (not certain).
 Port & Lester Co.—No description.

CHASSIS WITHOUT MOTOR.

C. J. Moore Mfg. Co.—Chassis and carriage bodies, gasoline veh.
 Centaur Mot. Veh. Co.—Electric runabout chassis.

MOTORS AND ENGINES.

Buffalo Gasoline Motor Co.—No description.
 Conger Mfg. Co.—Single, double, three-cyl. and four-cyl. vertical engines and one double-cyl. horizontal engine.
 Crest Mfg. Co.—Gasoline motors.
 Waltham Mfg. Co.—8 H. P. gasoline motor, 4 H. P. and 3 H. P. air-cooled.
 Ajax Motor Veh. Co.—Electric motors.
 Elmore Mfg. Co.—"Elmore" two-cycle motor.
 Loomis Automobile Comp.—Grant-Ferris motors.
 Post & Lester Co.—No description.
 Upton Machine Co.—Two-cyl. 5x5 horizontal gasoline motor; 4 cyl. 4x4½ vertical gasoline motor.
 A. H. Funke.—"Kelecom" gasoline motors in various sizes.
 Brennen Motor Co.—Gasoline motors.

CARBURETERS.

Shelby Motor Car Co.—"The Leppo Float Feed Carbureter."
 Waltham Mfg. Co.—No description.
 Loomis Automobile Comp.—Loomis carbureters.
 Duryea Power Co.—Duryea carbureter.
 Dow Portable Elect. Co.—No description.

TANKS.

Gleason-Peters Air Pump Co.—
 STORAGE BATTERIES (TRACTION).
 Centaur Mot. Veh. Co.—Electric Stor. Bat. Co. battery.
 Edison Storage Battery Co.—Edison battery.

VARIABLE SPEED AND TRANSMISSION

Upton Machine Co.—Upton transmission gears.
 Locomobile Company.—No description.
 Champion Mfg. Co.—Transmission gears.
 Baldwin Chain & Mfg. Co.—Chains.
 New Process Raw Hide Co.—Rawhide pinions and metal gears.
 Loomis Automobile Co.—Loomis transmission gears.
 Duryea Power Co.—Duryea self-oiling chains.
 Whitney Mfg. Co.—Chains.
 Peter Forg.—Compensating gears; sprockets.
 Thomas J. Wetzel.—Brown-Lipe equalizing gears.

ELECTRIC SPEED CONTROLLERS.

Ajax Motor Veh. Co.—No description.

GASOLINE MOTOR VEHICLES.

MANUFACTURER OR EXHIBITOR.	STYLE OF VEHICLE.	SEATS.			PRICE.					
		1 or 2	3 or 4	More than 4	Less than \$750	\$750 to \$1,000	\$1,000 to \$1,500	\$1,500 to \$2,000	\$2,000 to \$3,000	More than \$3,000
Locomobile Co.	Limousine.	2	3	6-7					not fixed	4,000
"	Roi des Belges.	4	5							
"	Small Tonneau.	4						2,000		
Automotor Co.	Touring Car.	4							2,500	
"	"	4							3,000	
Standard Automobile Co.	2-cyl., 10 H.P. Deauville Tonneau	4								3,250
"	4-cyl., 20 H.P. Deauville Tonneau	4								5,500
E. R. Thomas Motor Co.	No. 18 Thomas Tonneau	4					1,400			
"	No. 17 Thomas Tonneau	4					1,250			
American Motor Carriage Co.	Single Cylinder.	2				1,000				
Olds Motor Works.	Oldsmobile.	2	4		650			1,250		
"	" Tonneau Cab	2	4					1,100		
H. H. Franklin Mfg. Co.	4-cyl., air-cooled Light Roadster same, special equipment.	2						1,300		
"	"	2						1,400		
Thomas R. Jeffery & Co.	Rambler Touring Car, Model E.	2				750				
"	same, Model F.	2				750				
"	same, with dos-a-dos or tandem seat	4								
U. S. Long Distance Automobile Co.	12 H. P., 2-cyl. Tonneau	4							2,500	
"	7 H. P., 1-cyl. Tonneau	4					1,500			
"	7 H. P., 1-cyl. Runabout	2					1,250			
"	19 H. P. Delivery Wagon	in use by								
Packard Motor Car Company.	Packard, Model F, 1 cyl., 12 H. P. same, with Tonneau	2							2,500	
"	Model K, 4 cyl., 25 H.P.								2,500	
"	"									7,500
Central Automobile Company.	8 H. P. Mors Tonneau	4			not stated					
"	11 H. P. Mors Roi des Belges Phaeton.	4			not stated					
Winton Motor Carriage Co.	Touring Car, Tonneau			5					2,500	
Shelby Motor Car Company	10 H. P., 1 cyl., "The Shelby"	2	4				1,300			
"	20 H. P., 2 cyl., "The Shelby"								3,500	
Crest Mfg. Co.	Touring Car, Light Runabout, Model F.	3			600					
"	Heavy Runabout, Model D.	2				750				
"	Runabout, Model C.	2			550					
Motor Cycle Mfg. Co.	Marsh Motor Cycle.				not stated					
Motor & Gear Mfg. Co.	15 H. P., 2 cyl. Roi des Belges Tonneau			5					2,500	
"	35 H. P., 4 cyl. Roi des Belges Tonneau			5						4,000
Autocar Comp.	10 H. P. "Autocar," Model A.	4						1,700		
"	10 H. P. "Autocar," Model D.	2						1,800		
Hall Motor Veh. Company.	20 H. P. Touring Car, Aluminum Body.	4								5,000
Homan & Schulz Smith & Mabley	Runabout	2	4				800			
"	C., G. & V. Tonneau			5						5,500
"	Panhard Tonneau				not stated					
B. V. Covert & Co.	"Motorette," 3 H. P.	2			500					
"	Covert "Chainless," 5 H. P.	2			750					
Hoffmann Auto. & Mfg. Co.	"Combined" Tour. Car	2								
"	Runabout, 7 1/2 H. P.	4					950			
Pope-Robinson Co.	Tonneau Tour. Car, Canopy Top.			5-6						6,000
Whitney Auto. Co.	Runabout	2					800			
Waltham Mfg. Co.	"Orient" Motor Car, 8 H. P.	2	4					1,200		
"	"Orient" Buckboard, 4 H. P.	2					500			
"	"Orient" Motor Cycle, 3 H. P.						250			
J. Stevens Arms & Tool Co.	"Doctor's" Runabout, top.	2	4					1,200		
Moyea Auto Co.	4 cyl. Touring Car			5						5,000
O. H. Keep, Jr.	4 cyl., 16 H. P. "F. I. A. T." Tonneau			5						5,000
H. Bartol Brazier	Tonneau Touring Car, canopy, 2 front glass.			6						2,500
C. J. Moore Mfg. Co.	Touring Car, Model J.			6						3,000
"	Touring Car, Model G.	4								2,500
Elmore Mfg. Co.	Runabout	2					800			
"	Touring Car.	4					1,400			
Rainier Co.	Ten Touring Cars of assorted sizes and prices, made by Berg Auto. Co.									
Loomis Auto. Co.	Touring Car.			5	not stated					
Duryea Power Company.	Phaeton, 3 wheel	2					1,250			
Kirk Mfg. Co., space of Century Motor Veh. Co.	Touring Car.	4						1,750		
Backus Water Motor Comp.	Touring Car, air-cooled.	2			not stated					
F. B. Stearns Co.	Touring Car.	6							3,000	
"	Suburban Car.	4							2,000	
Berg Auto. Co.	See Rainier Co.									
Electric Veh. Co.	34 H. P. Tonneau			5						5,000
Conrad Motor Carriage Co.	Runabout	2					750			
"	Touring Tonneau	4					1,250			
Apperson Bros., General Auto. & Mfg. Co.	Touring Car, "Class B"	4							3,000	
"	Runabout	2					900			
General Auto. & Mfg. Co.	Runabout with det. Tonneau.	4					1,000			
Kensington Auto. Mfg. Co.	12 H. P. 2 cyl. Tonneau.			6						2,500
Willis Park Row Bicycle Co.	Merkel Motor Cycle.	1						no price	given	
"	Motor Cycle Trailer	1						no price	given	
Upton Machine Co.	4 cyl. vert. Tonneau.			5						3,000
Peerless Mfg. Co.	Touring Car.	4	5					no price	given	
Warwick Cycle & Auto. Co.	Runabout	2	4				1,900			

ADDITIONS

Manufactures of vehicles who have exhibits, but have not supplied the information about styles or models, seating capacity and prices contained in the above table are as follows:

Steam Vehicles.—White Sewing Machine Company, spaces 86, 87, 88 and 89; Century Motor Vehicle Company, space 3 basement.

Gasoline Motor Vehicles.—Hendee Mfg. Co., motor bicycles, in space 37 marked for C. F. Splittorf, on the ground plan; Meteor Engineering Company, space 69; International Motor Car Company, spaces 73, 74, 75 and 76; Pan-American Motor Company, spaces 77 and 78; Knox Automobile Company, space 79; George N. Pierce Co., space 101; Spaulding Automobile & Motor Company, space 110; Ward-Leonard Electric Company, space 116; S. B. Bowman Automobile Company, space 121 (who

will exhibit a Steam Hose and Chemical Cart, price \$6,000, described in this issue); Searchmont Automobile Company, space 123; Haynes-Apperson Company, space C; Cleveland Automobile Company, space J; Webster Auto. Company, space N; Cadillac Automobile Company, space 8, basement; Kenneth A. Skinner, spaces 10 and 11, basement (who will show the De Dion et Bouton exhibits from the Paris Salon); American Chocolate Machinery Company, space 14, basement; Buckmobile Company, space 18, basement; Sinto Motor Car Company, spaces 19 and 20, basement; A. Clement Cycle Motor & Light Carriage Company, space 31, basement; Pickling & Fulton; Desberson Motor Car Company; Matheson Motor Car Co., Ltd., who exhibit 14, 25, 30 and 40-horse power Detachable Tonneau vehicles, priced \$2,000, \$2,500, \$3,000 and \$7,000 (information received too late for tabulation).

CLASSIFIED LIST OF COMPONENTS AND ACCESSORIES—(Continued).

IGNITION APPARATUS.

American Coil Co.—Ammeters, dynamos, coils, plugs.

Locomobile Company.—No description.

National Carbon Company.—"Complete line."

Dayton Elect. Mfg. Co.—Dynamos, magnetos, coils, plugs, timing devices.

Crest Mfg. Co.—Ign. coils.

Goodson Elect. Ignition Co.—Igniter and spark plug.

Dow Portable Elect. Co.—Ignition apparatus.

GASOLINE AND KEROSENE BURNERS.

Grout Bros.—Gasoline and kerosene.

Post & Lester Co.—Gasoline and kerosene.

Locomobile Company.—Gasoline and kerosene.

CIRCULATION PUMPS.

Loomis Automobile Comp.—Loomis circulation pumps.

AIR PUMPS.

Hartford Rubber Wks. Co.—Tire pumps.

Gleason-Peters Air Pump Co.—For hand or power; special designs.

Reason Automatic Air Pump Co.—On stand of Chas. E. Miller.

CARRIAGE BODIES.

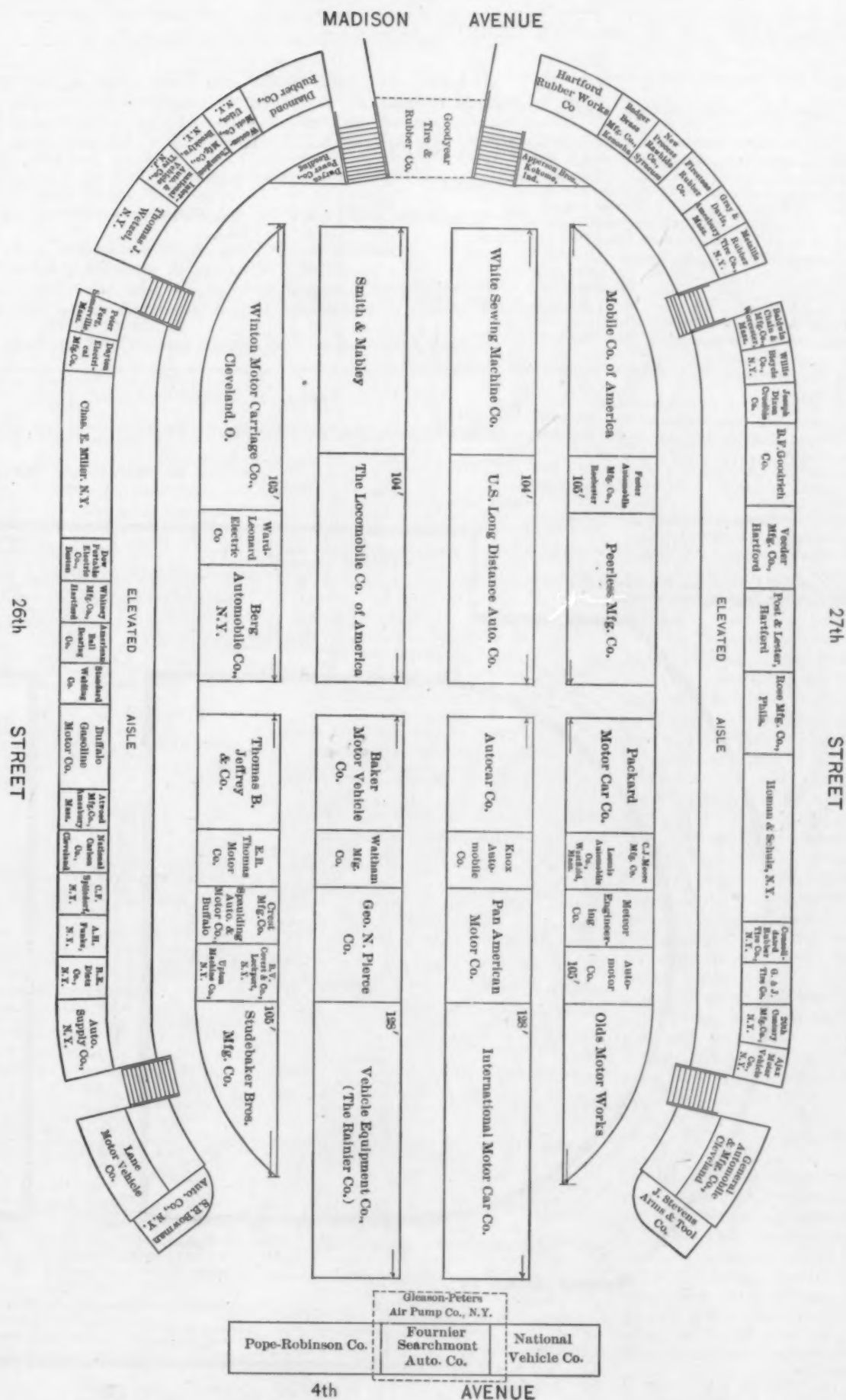
C. J. Moore Mfg. Co.—Bodies and running gears; gasoline veh.

TIRES.

Consolidated Rubber Tire Co.—"Kelly Springfield," "Traction" and "Sectional," being three styles of solid rubber tires.

G & J Tire Company.—G & J detachable.

[Continued on page 71.]



Supplementary List with Changes.

American Coil Co., West Somerville, Mass.—Space 5, Basement, with Elwin L. Smith.
 American Roller Bearing Co., Boston.—Space 8, Balcony, with Baldwin Chain & Mfg. Co.
 Barber Mfg. Co., Boston.—Space 5, Basement, with Elwin L. Smith.
 Berg Automobile Co., New York (Rainier Co., Agts.).—Spaces 101-102, formerly Geo. N. Pierce.
 Brown-Lipe Gear Co., Syracuse.—Space 53, Balcony, with Thos. J. Wetzel.
 Cole & Woop, New York City.—Space 52, First Tier Boxes.
 Country Club Car Co., Boston.—Space 24, Basement, formerly H. M. Woodward.
 Desberson Motor Car Co., N. Y. City.—Spaces 44-46, First Tier Boxes.
 Edison Storage Battery Co., Orange, N. J.—Space 50, First Tier Boxes.
 Electric Contract Co., N. Y. City.—Space 42, First Tier Boxes.
 Electric Storage Battery Co., Phila.—Space D, Restaurant, with Electric Vehicle Co.
 Electro-Magnetic Speed Changing Gear Co., N. Y.—Space 33, Basement, formerly Wheel Within Wheel Co.
 Fickling & Fulton, N. Y. City.—Space, 100, Main Floor, with Covert and Upton Gear Co.
 Fisk Rubber Co., Chicopee Falls, Mass.—Space 5, Balcony, with Firestone Rubber Co.
 Goodson Elec. Ignition Co., N. Y. City.—Space 48, First Tier Boxes.
 Hendee Mfg. Co., Springfield, Mass.—Space 37, Balcony, with C. F. Splittorf.
 Internat'l Fire Eng. Co., N. Y. City.—Space 130, End Box, with Gleason-Peters Air Pump Co.
 Hyatt Roller Bearing Co., Harrison, N. J.—Spaces 41-43, First Tier Boxes.
 Kirk Mfg. Co., Toledo.—Space M, Restaurant, with Centaur Motor Veh. Co.
 Lindsay-Russell Co., Indianapolis.—Spaces 26-27, Basement, formerly Lindsay Auto. Parts Co.
 Mfg. & Selling Co. of America, N. Y. City.—Space 40, First Tier Boxes.
 Matheson Motor Car Co., Ltd., Grand Rapids.—Spaces 19-20, Basement, formerly Sintz Motor Car Co.

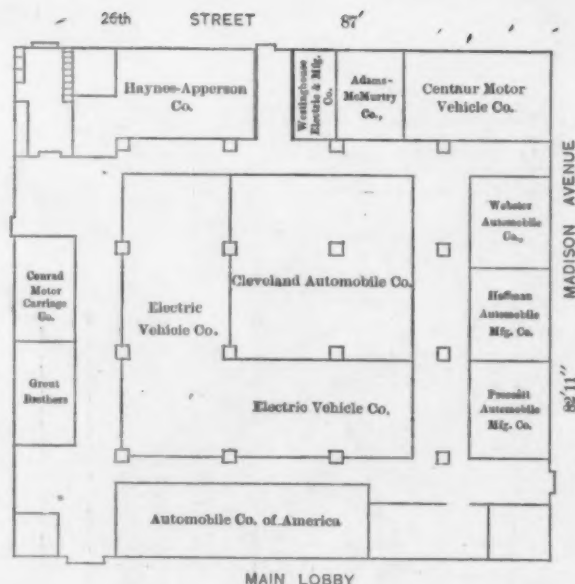
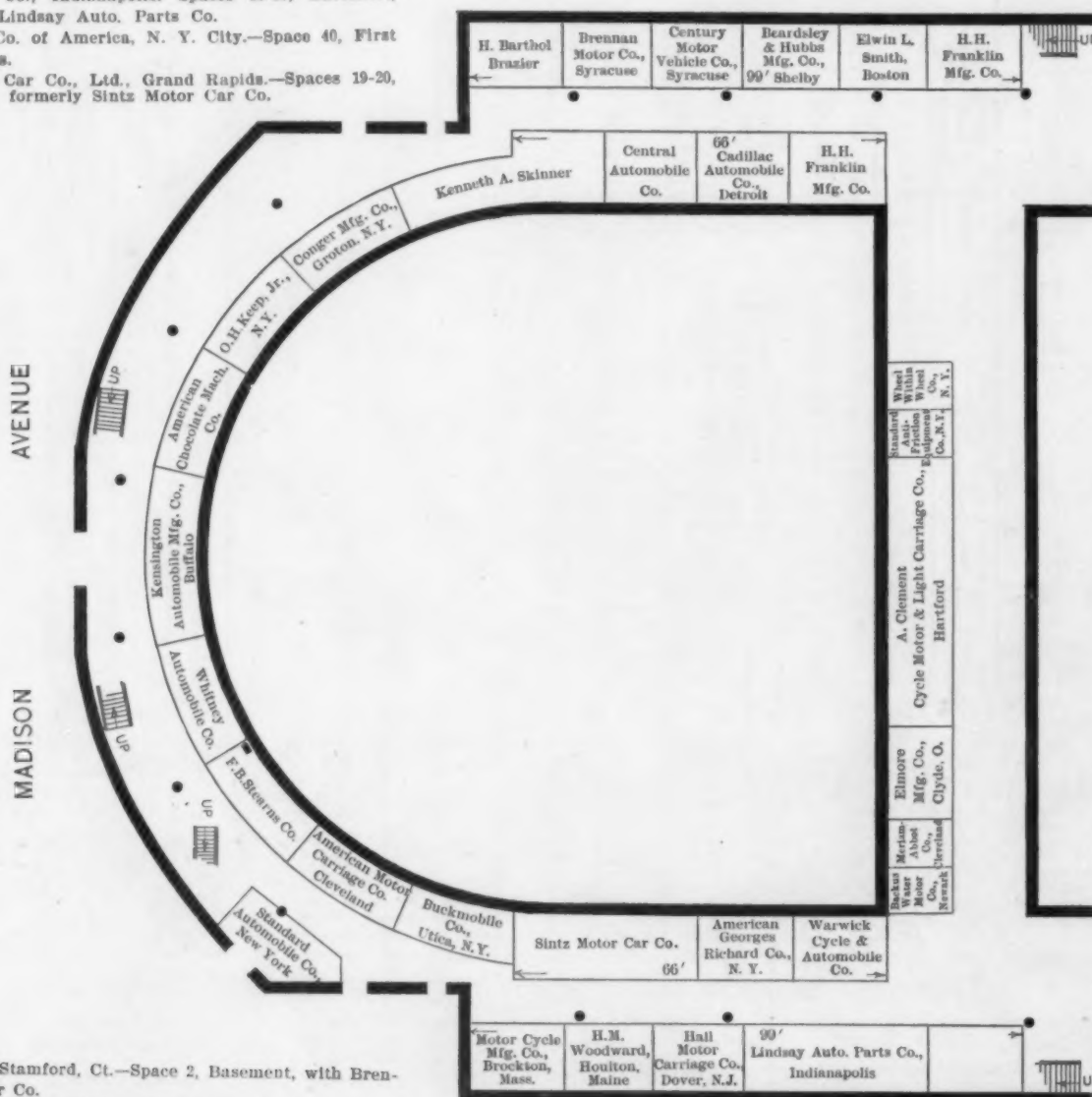


DIAGRAM OF RESTAURANT SPACES.



Machaley Bros., Stamford, Ct.—Space 2, Basement, with Brennan Motor Co.
 Midgley Mfg. Co., Columbus, Ohio.—Space 53, with Thos. J. Wetzel.
 Motor & Gear Mfg. Co., N. Y. City.—Space 39, First Tier Boxes.

[Continued on page 71.]

26th

STREET

ARRANGEMENT OF BOOTHS IN BASEMENT.

FIXED EVENTS FOR THREE MONTHS.

- Jan. 17-24—Third Annual Automobile Show, Madison Square Garden, New York.
 Jan. 20—Annual Meeting American Automobile Association, 753 Fifth Ave., New York, 4 P. M.
 Jan. 22—Annual Meeting American Motor League, New York City. Time and place not announced.
 Jan. 22—Meeting Commercial Vehicle Makers with A. C. A. Race Committee, 753 Fifth Avenue, New York, 4 P. M.
 Jan. 23—Annual Business Meeting National Association Automobile Manufacturers, Madison Square Garden, New York.
 Jan. 24—Annual Banquet Automobile Club of America, Waldorf-Astoria Hotel, New York, 10 P. M.
 Feb. 2-9—Local Automobile Exhibition, Gray's Armory, Cleveland.
 Feb. 9-14—Tri-State Automobile and Sportsmen's Show, Detroit.
 Feb. 14-21—Third Annual Automobile Exhibition, Coliseum Building, Chicago.
 Feb. 14-21—Good Roads Convention, National Association of Automobile Manufacturers, Coliseum, Chicago.
 Feb. 19—Smoker for Trade Visitors, Convention Hall, Coliseum Building, Chicago.

COMPLETE LIST OF COMPONENTS AND ACCESSORIES

(Continued from page 68.)

B. F. Goodrich Co.—Clincher, single tube and solid.
 Metallic Rubber Tire Co.—Tires and tire covers.
 International A. & V. Tire Company.—No description.
 Fisk Rubber Co.—Single tube and double tube detachable.
 Firestone Tire & Rubber Co.—Side wire tires, light and heavy.
 Standard Anti-Friction Equipment Co.—Beasley elastic tire; truss construction.
 Goodyear Tire and Rubber Co.—Clincher; detachable; single tube; endless solid.
 Hartford Rubber Works Co.—Single tube; detachable; endless solid.
 Diamond Rubber Co.—Single tube; detachable for American cars; detachable for French cars.

WHEELS, AXLES AND BEARINGS.

Locomobile Company.—No description.
 Timkin Roller Bearing Axle Co.—Wheels, roller-bearing axles, artillery hubs.
 American Ball Bearing Co.—Ball-bearing artillery wheels and wire wheels, steering axles, ball-bearing driving axles and thrust ball-bearings.
 Hyatt Roller Bearing Co.—Flexible roller bearings for driving axle, steering axle and countershaft; roller bearings for same; self-oiling bearings.
 Weston-Mott Co.—Front and rear axles; artillery wood and wire wheels; steel rims.
 Centaur Mot. Veh. Co.—Wheels.
 Thomas J. Wetzel.—Midgley tubular steel wheels; Timkin roller bearings, etc.

RADIATORS AND COOLING APPARATUS.

Whitlock Coil Pipe Co.—Specialty: Avoidance of pipe fittings, electric welding and brazing.
 Loomis Automobile Co.—Loomis radiators.

STEAM CONDENSERS.

Locomobile Company.—No description.
 Whitlock Coil Pipe Co.—Specialty: Avoidance of pipe fittings, electric welding and brazing.

MUFFLERS.

Loomis Automobile Comp.—Loomis mufflers.

LAMPS.

Rose Mfg. Co.—"Neverout" oil and gas lamps.
 A. H. Funke.—Acetylene lamp convertible into candle lantern.
 Badger Brass Company.—Acetylene, oil and electric lamps, brackets, cowls.

Electric Contract Co.—Electric hand flash lamps and electric gauge-glass lamps.
 Gray & Davis.—Gas, oil and electric.
 Atwood Mfg. Co.—"Stay-lit" oil lamps; electric lamps.
 R. E. Dietz Company.—Oil lamps; gas lamps.
 Twentieth Century Mfg. Co.—Lamps.

ALARMS AND SIGNALS.

A. H. Funke.—Horns.
 B. F. Goodrich Co.—Horns.
 Gleason-Peters Air Pump Co.—Foot alarms.
 Hartford Rubber Wks. Co.—Horns.

MEASURING INSTRUMENTS.

Veeder Mfg. Co.—Odometers (distance traveled), tachometers (rate of speed), cyclometers, counters, portable tachometers.

BRAKES.

Centaur Motor Veh. Co.—No description.

GENERAL AUTOMOBILE GOODS.

Post & Lester Comp.—Material and supplies.
 Chas. E. Miller.—Manufacturer, jobber and importer.
 Manufacturing & Selling Comp.—Supplies.
 Willis Park Row Bicycle Co.—General supplies.

SPECIAL AUTOMOBILE GOODS.

Badger Brass Comp.—Auto. jacks, "Simplex."
 Dayton Elect. Mfg. Co.—Gasoline motor governors.
 Joseph Dixon Crucible Co.—Graphite lubricants.
 Standard Welding Co.—Steel tubes; electric welding, axles, gear cases.
 Hartford Rubber Wks. Co.—Mats and matting, rubber tubing, rubber springs and bumpers.
 Gleason-Peters, Air Pump Co.—Needle valves, nipples, oilers, gauges.
 New Process Raw Hide Co.—Rawhide pinions and metal gears.
 Whitney Mfg. Co.—Keys and cutters for Woodruff keying system.
 Peter Forg.—Regulators; valve wheels; sheet steel stampings; tube expanders; Miscellaneous.
 Shelby Steel Tube Co.—Steel tubing for automobile construction.
 Elwin L. Smith.—Steering check (to prevent jiggling of steering gear and wheels).
 Wheel Within Wheel Co.—Special wheel with resilient rim.
 New Jersey Asbestos Co.—Asbestos gaskets, washers and wrapping.

SUPPLEMENTARY LIST WITH CHANGES—(Concluded).

National Motor Vehicle Co.—Space L, Restaurant, formerly Adams-McMurtry Co.
 Noyes Auto. Co., Marion, N. J.—Space G, Restaurant, formerly Auto. Co. of Am.
 Oldsmobile Co., N. Y. City.—Space H, Restaurant, formerly Auto. Co. of Am.
 Paris Automobile Co. (Henri Fournier).—Space N, Restaurant, formerly Webster Auto. Co.
 Geo. N. Pierce Co., Buffalo.—Space 114, Main Floor, formerly Berg Auto. Co.
 Shelby Motor Car Co.—Space 4, Basement, Successor Beardsley & Hubbs.

Shelby Steel Tube Co., Pittsburg.—Spaces 47-49-51, First Tier Boxes.
 Stearns Steam Carriage Co.—Space 115, Main Floor, formerly Berg Auto. Co.
 Timken Roller Bearing Co.—Space 53, Balcony, with Thos. J. Wetzel.
 Union Motor Truck Co., Phila.—Space H, Restaurant, formerly Auto. Co. of Am.
 Waltercar, N. Y. City.—Space 14, Basement, formerly Am. Chocolate Mch. Co.
 Whitlock Coil Pipe Co., Hartford, Ct.—Space 45, First Tier Boxes.

TRACK VERSUS ROAD RACING—AND THE GORDON BENNETT.

BY H. S. HARKNESS.

Those who have had experience in automobile racing, both on roads and tracks, are aware that a machine adapted to one need not necessarily be best for the other.

There is a great deal of difference between the flat, smoothly rolled surface of a speeding track and the grades and inequalities to be met on the road.

Many machines which are capable of maintaining speeds of a mile a minute or less on smooth roads cannot with any degree of safety equal the same figures on a track and vice versa. This is more or less of a paradox, but nevertheless true.

This country has never witnessed that which may be truly termed a road race, for two reasons, viz.: the laws prevent automobiles traveling at anywhere near their limit of speed, and this country possesses few roads of sufficient length suitable for the purpose.

For track racing a machine may be of comparatively light construction as compared with the power, as it will not be subjected to the shaking-up incident to road racing. When traveling at speed and suddenly encountering ridges or gullies, the car is liable to leave the ground entirely.

For a lengthy and severe road race the frame and running gear must be strong to carry the powerful motor, large supply of fuel, water and occupants.

While the course for a road race may have its turns, the effect upon the time over an extension course is not so appreciable as would be the turns on a track. The reason for this is that the road turns may be approached at full speed, and but a few seconds elapse before the corner is rounded and full speed again applied, while on a track at least one-third of the entire distance covered is upon curves where a certain diminution of speed is necessary.

Then, again, on a track small wheels are advantageous while large ones are better for road use.

As to gearing, one may use the highest upon tracks, where no hills are to be encountered, but on roads where there may be steep grades a lower gear is essential and more power must be held in reason for such occasions to avoid decreasing the speed.

In the selection of cars to make up the team that will represent the Automobile Club of America in the Gordon Bennett contest, all these points have to be considered, and it is not probable that machines which are simply successful as track racers, will receive the favorable consideration of the racing committee of the club.

For my own part, I shall endeavor to produce a car which embraces all the qualifications essential in a test similar to that which will be required, not only for preliminary trials, but for the racing itself, and would say that did I not believe I had an excellent chance of coming up to my most optimistic desires, I would not have embarked in the undertaking.

THE AUTOMOBILE

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SATURDAY, JANUARY 17, 1903.

THE NEW YORK SHOW.

Managed under the joint auspices of the Automobile Club of America and the National Association of Automobile Manufacturers the Show which opens to-day in the Madison Square Garden in New York bids fair to eclipse all previous class exhibitions held in this country, not only in popular interest, but also in volume and value of the exhibits. Under the experienced hands of Frank Sanger, the manager of the Show, and his secretary, Mr. Young, everything pertaining to the admission and placing of exhibits has moved with the smoothness born of routine; room has been found for all who desired space, even late comers, and yet there has been no more space to be had for some time past—a contradiction which finds its explanation in the accommodating spirit which has pervaded the arrangements. Stringent rules have been maintained with dignity and relaxed with good grace, as good managers do those things. The daily and the class press have been supplied with the proper notices by a press agent who was well fitted for his task, and banquets and conventions in connection with the event have been duly appointed by the two patron organizations. It is now incumbent upon the automobile industry and upon the public to show that the internal and the external progress of the automobile movement have gone hand in hand; and there is little doubt that this demonstration will be made. As usual, the first two or three days will probably be spent by the members of the industry in taking stock each of his own status among his competitors and with the public, and by the latter in sight-seeing and preliminary observations. Then will follow the trade period, in which orders will

be booked, opinions formed, minor changes in construction resolved upon and estimates made of the necessary provisions for meeting the spring demand. There will be disappointments and surprises, no doubt, but on the whole, the expansion of public interest in automobiles and the growing confidence in their serviceability, will take care of those whose product may not be exactly in line with the public opinion that the Show itself will create; for, after all, the convictions of each manufacturer, as expressed in his product, find their counterpart among the purchasers and usually in proportion to his productive capacity. Great revulsions in the public's taste are not to be expected. Nothing has happened during the past year to move the center of gravity of the industry very far in new directions. If steam vehicles received a setback, commercially speaking, at the shows in the fall of 1901 and the spring of 1902—a setback which ordinarily would grow in intensity—the contests here and abroad have, on the other hand, shown the good qualities of improved steam vehicles in a flattering light. Judging from the comparatively meager representation of steam vehicle makers it may indeed be doubted if the industry has not lost heart in this branch of automobilism to a greater extent than the public.

THE ABSENTEES OF THE SHOW.

An old French proverb says that "the absent are always in the wrong," and this seems to apply, even more literally than intended, to those manufacturers of automobiles who will not be seen at the Madison Square Garden next week. A school of constructors seems to have grown up in and around Chicago, who have pinned their faith to the "friction drive," and staked their capital on its successful application to mechanical vehicles. There can be no doubt that these constructors have already made much progress in neutralizing the theoretical shortcomings of power transmission by friction devices, and, while they have hardly said their last word, their product would have been a welcome addition to the variety of the show and might have inspired Easterners with a wholesome desire to show a similar independent spirit in matters of construction. It would be too bad if New York, having received its skyscraper construction from Chicago, should also eventually be compelled to accept new methods in automobile building from the same source, merely by reason of neglecting one of those possibilities for improvements which at first seem a little heretical to the orthodox engineer.

Another branch of automobile work will be conspicuous by its absence. Few, very few, heavy business vehicles will be seen, except electric trucks, and yet it is known that much substantial progress has been made in steam and gasoline motor wag-

ons of the same class. In light steam vehicles, too, there are a couple of notable non-appearances. The public undoubtedly would have liked to see more than one example of the horizontal steam engine fitted to a runabout at the show; yet this is all that the writer can discover on the schedule of exhibits.

NO SHOW FORECAST.

In its preparations for the Show this publication has taken a purely utilitarian view. The descriptive "forecasts" of exhibits which it has been customary for the class press to print, have never been satisfactory or representative, as they could not possibly be based on personal observation. The advertising pages in this issue, to which our readers' attention is specially directed, take the place of a "forecast" in a much more authoritative manner. In them each maker of automobile goods speaks of what he knows. THE AUTOMOBILE, on the other hand, has compiled such information as should be of value to the Show visitors and to the trade, as well, namely the lessons of practical experience on the road as demonstrated in the recent 500-Mile Reliability Contest of the Automobile Club, and brief tables of the exhibits at the Show which will permit all quickly to discover where the automobiles and automobile merchandise are to be found, which correspond to their requirements in regard to price and purpose or technical interestedness. An analysis of what the Show is and what it contains will follow in logical sequence, that is, when it shall have been seen and its object lesson properly absorbed and digested.

THE COOLING SYSTEM.

The battle between the vertical gasoline motor at the front and the horizontal motor at the rear or under the middle portion of automobiles, has not yet been fought out, but it has reached a crisis apparently. While the mere question of verticality or horizontality remains in abeyance—and seems likely to remain so forever—the question between front and rear location is in the acute stage. For light pleasure vehicles the motor-rear system may still be defended on the ground of bringing more weight on the driving wheels, producing easier steering, less tendency to skidding and lending itself nicely to concealment of the machine portion of the vehicle; but for automobiles of heavier draft, in which the weight of the motor apparatus over the front axle is no important objection, or even an advantage, the motor-front partisans are getting the best of the argument. The importance of a perfectly reliable cooling system and the demand for a uniform chassis, to which all kinds of vehicle bodies may be fitted, are factors which help them out. It is difficult to conceive of a motor-rear frame adaptable to more than the particular style of vehicle for which it

was designed, while the motor-front arrangement has already been developed to the point where the long, flexible bevel-gear shaft is the only important organ extending rearward from the driver's seat to the rear axle, leaving the larger portion of the frame subject to the body-builders' art or available for business uses. In the tabulated records of the recent Reliability Contest from New York to Boston, and return, printed in this issue, troubles with the cooling system are shown to have exceeded those due to faulty ignition and fuel feed as causes for delay, and a considerable portion of these troubles may doubtless be traced to the long canalization necessary to carry the cooling water from a motor in the rear to a radiator at the extreme front, where the cooling coils are preferably located. With the flexibility of frame which the rough American roads render quite necessary, the piping under such circumstances is subject to a good deal of irregular torsion, resulting sooner or later in leaks, or where hose connections are used, in the undoing of joints or other troubles. At all events, even where no pipe defects are invited, a compact cooling system is a decided advantage by the security it offers against strains and clogging of the conduits.

CLUBS URGED TO RALLY FOR MUTUAL BENEFIT.

All automobile clubs, whether affiliated or independent, are urged in a letter from President Winthrop E. Scarritt, to send representatives to the annual meeting of the American Automobile Association to be held on Tuesday, January 20, at 4 p. m., at the headquarters of the organization at 753 Fifth Avenue, New York. The purpose of this invitation is to better acquaint the clubs with the objects of the Association and to secure their hearty support and co-operation. The letter briefly reminds the motorists that they now occupy the precarious position of the pioneer and that there are prejudices to their use of the highways to be overcome; that there is need for the self-protection that can be secured through the strength of union, and that such organization can be made most effective in influencing national legislation for the building of good roads.

CONFERENCE CALLED ON COMMERCIAL VEHICLE CONTEST.

Manufacturers of trucks, delivery wagons and all types of commercial vehicles are invited, in a circular letter issued on January 10 by the Automobile Club of America, to meet in conference with the Contest Committee of the club to formulate rules for a contest of such vehicles to be held next Spring. This meeting is to be held at the club house, 753 Fifth Avenue, New York, at 4 p. m., on Thursday, January 22, concurrent with the Madison Square Garden exhibition.

NOLLE PROSSE IN DUPUY MANSLAUGHTER CASE.

NO TRIAL FOR YALE STUDENT.

State Attorney and Presiding Judge Say Jury Would Not Have Brought in Verdict of Guilty—History of the Case—Comparison with Severe Sentence of Herbert Marble.

Special Correspondence.

NEW HAVEN, Conn., Jan. 12.—Connecticut's second case of destruction of human life by an automobile, that of the State vs. Harry W. Dupuy, a Yale student, was disposed of in the Criminal Superior Court last week by a nolle. In thus winding up a matter that has attracted considerable attention in the automobile world, State Attorney Williams, who is famed in this State as a relentless pursuer of all classes of criminals, said that it was his opinion, as well as that of the presiding Judge of the Court, John M. Thayer, that a jury would not find Dupuy criminally responsible for manslaughter with which he was charged, when all of the circumstances of the accident were taken into account, and consequently the State Attorney did not deem it the part of wisdom to put the case to trial.

HOW THE ACCIDENT OCCURRED.

This disposes of a matter that has been on the docket of this court since last fall. Dupuy, who is a son of a wealthy steel magnate in Pittsburg, is a member of the academic class of 1903 in Yale University. On June 19 last, while driving an automobile across Tomlinson's bridge at a high rate of speed in order to get clear of an opening draw, he ran down a stationary engineer named D. Thorpe Munro, who, also in a hurry, crossed the street on a bicycle directly in front of the automobile. There were several students with Dupuy, who was later arrested for fast driving and fined in the police court.

Munro lived but a few days after his injury, and Dupuy at his death was arrested for manslaughter. He waived examination in the police court and the case has been in the Superior Court ever since.

RECOMPENSE MADE BY DUPUY.

Dupuy's attitude immediately after the accident and ever since toward the injured man, and his family has undoubtedly had much to do with the outcome of the case. While he was not intentionally the slayer of Munro, he appears to have been technically guilty of manslaughter, but by his conduct he has undoubtedly wrought more relief for the sufferers by Munro's death than any punishment that could have been inflicted upon him could have done.

Immediately after the accident he took Munro home in his automobile and provided him with physicians and nurses and did everything that could be done to bring about a recovery. It is stated that the Munro family have always regarded the casualty as an accident pure and simple, but whether this be true or not, it is true that

Dupuy has paid the family \$5,000 as a recompense for the loss of the husband and father.

CONTRASTED WITH MARBLE CASE.

There is considerable adverse comment among motorists and others over this disposition of this case, while Herbert A. Marble, of New York, charged with manslaughter, and tried in the same court, was sent to the county jail for one year. Marble ran an automobile into the wagon of a farmer named John Molz on the Wallingford road, and fatally injured Molz, whom the testimony appeared to show had been drinking and was driving on the wrong side of the road. Friends of Dupuy, however, say that the two cases were entirely different, and that the outcome of the Marble case could not have been the same as the Dupuy case, by reason of the circumstances surrounding Marble at the time of the killing of Molz. Marble was indulging in reckless riding, it is asserted, and was running an automobile on a strange road in a thick fog at 11 o'clock at night with irresponsible companions.

MARBLE SERVING SENTENCE.

It has been stated that an appeal would be taken from the judgment of the court in the Marble case, but time has passed and nothing has been heard of it. Marble went at once to jail upon the imposition of the sentence upon him. That was in October. He has already served nearly three months of his sentence, and as he will get nearly two months off from his term of confinement for good behavior, it follows, an official said to-day, that he has but about seven months more to serve. His was the first conviction of an automobilist in Connecticut for causing the death of another by the operation of a motor vehicle.

Friends of the sport of automobilism note with satisfaction that neither of the above fatalities would have occurred, probably, had the machines been in the hands of older and more careful operators.

FIRST BOSTON SPEED CASE BEFORE JURY.

Special Correspondence.

BOSTON, Jan. 12.—The first automobile speed case in Boston to be carried before a jury was that of George Gordon Reed, who, in taking a party up Huntington Avenue on November 18 was timed by two policemen with stop watches, arrested for exceeding the ten-mile limit, and in the lower court was fined \$25. On appeal the case came before the Superior Criminal Court jury and Judge Stevens on January 2, and the decision appeared to hinge on the correctness of the timing. The policemen had stood at West Newton Street, and had merely their judgment to tell them when Mr. Reed's machine started toward them on their measured stretch at Garrison Street, 535 feet distant. Both policemen testified that the machine covered the stretch in twenty-seven seconds,

whereas in order not to break the law it should have used up thirty-three seconds.

Several witnesses testified that Mr. Reed was not running faster than the legal rate when he was stopped. Arthur Underhill, agent for the vehicle in which the party was riding, testified that with the levers set exactly the same and with street conditions identical as when the arrest occurred, he and Mr. Reed had made several trials over the same stretch on the following day and had timed themselves accurately at 36, 37 and 38 seconds for three attempts. Harry Knight, of the Chronograph Club, a professional timer, showed how it would be highly improbable that, if correctly used, both policemen's watches should mark exactly twenty-seven seconds, since even in the hands of professionals the best timing-watches vary slightly.

But the government won the case. The jury brought in a verdict against Mr. Reed, and Judge Stevens allowed the fine fixed by the lower court to stand. Mr. Reed has until January 15 to file a bill of exception, but he has not yet decided whether to avail himself of the opportunity or to drop the matter where it is.

Proposed Indiana Bill Ridiculed.

INDIANAPOLIS, Jan. 10.—Members of the House of Representatives in the Indiana legislature are prone to laugh at the measure proposed by Senator Johnson, of Montgomery County, to regulate the use of automobiles on country roads.

The bill will provide that drivers must slacken their speed to four miles an hour when with 150 yards of approaching horses, and maintain such speed until the horse has passed. Should the horse or other animal show signs of undue emotion, the motorist must bring his machine to a stop and so remain until the agitated animal has calmed down. The bill will also provide that all machines shall be registered with the county clerk, each machine to be tagged on the rear in bold characters that shall be legible at a distance of 150 feet. The theory of having the numbers or letters on the rear of the machine is that in case of an accident the injured person or other spectators can note them on the rear of the vehicle in case the driver attempts to run away.

The bill will provide that violators of the law shall be fined in any sum between \$5 and \$100, or imprisoned in the county jail or both. It is said that the Farmer's Horse Thief Association is behind the movement.

At the Tuesday evening meet at the Automobile Club of America this week the subject of discussion was "Analysis of Automobile Troubles on the Basis of Percentage." The Tuesday club night next week will be omitted on account of the Show at the Madison Square Garden.

Correspondence

Circulation in Cold Weather.

Editor THE AUTOMOBILE:

Sir:—I have an Oldsmobile and in this zero weather use no glycerine or other mixture in the water. Here is the way it is done:

Take a wide piece of common oilcloth and attach beneath the cylinder; bring it up around and over the mixer and water tank, then lightly stuff a piece of waste felt in between the mixer and oilcloth. This keeps everything warm so that one turn of the crank is sufficient to start the engine. Then the coils under the dashboard are protected with oilcloth tacked on and brought under the coils and secured. It is hoped this may be of value to those who may have had trouble.

O. LANG, M.D.

Detroit, Mich.

American Automobiles in Japan.

Editor THE AUTOMOBILE:

Sir:—We beg to hand you by this mail a copy of our catalogue of automobiles. We have tried to cover the field carefully and to give to the intending purchaser, in as compact form as possible, illustrations of machines of to-day. We issue this from time to time as styles change, and of this present edition some 3,000 copies have been distributed in Japan, China, Straits Settlements and the Orient in general. We intend to enlarge this publication later, to include not only automobiles, but liquid fuel power machines of all kinds, and would be interested to hear from anybody who desires information as to the possible sale of new products in these lines. We are obliged for the news we receive from your valued publication and are sincere in believing that the trade in general receives its greatest impetus through such journals as yours.

BRUHL FRERES,
Yokohama. Per W. Ballenheim.

Carbureters for Varying Air Pressure.

Editor THE AUTOMOBILE:

Sir:—I have read with much interest the articles in your valuable periodical under the head of "Auto Information for the Novice," but fail to find the most vital part of a gasoline machine mentioned.

It is perhaps well known that the great difficulty with gasoline machines is the proper mixing of air and gasoline in the mixer or carbureter. It is not perhaps too much to say that the failure of gasoline machines—when they have failed—can in 90 per cent. of cases be attributed to the mixers. The mixing of air under different atmospheric conditions automatically is yet perhaps an unsolved problem, but some devices are better than others. Would it not be well for you to give descriptions of different methods; and your criticism might lead to the production of

something better than anything yet used.

Take a machine from an altitude of 500 feet to an altitude of 2,500 feet and the air intake must be attended to or the machine stops, and even at the same elevation the pressure of the atmosphere varies. An air tank with air pump attached to machinery which would keep air at an even pressure might assist.

Ventilate the matter in your valuable paper and let us see if some improvement cannot be made that will place the most convenient form of power in a better position.

JOHN GARDINER.

Tucson, Arizona.

[The articles entitled "Auto Information for Novices," are intended mainly for those who have not yet become owners of automobiles, and construction matters are treated in them in a general way only. In the series headed "The Gasoline Vehicle in Detail," which was concluded in the issue of December 13, the carbureter was discussed at some length, notably in the issue of July 19, 1902. Valuable ideas in this connection will also be found in the series of articles by Capt. Longridge, of which the last installment is yet to come. Recently the new Krebs carbureter was described and illustrated, and under "Information for Buyers" the Mosler "gasifier" was briefly referred to and shown in cross-section as well as external view.—Editor.]

Direct Gasoline Pump Satisfactory.

Editor THE AUTOMOBILE:

Sir:—Inclosed I send check of \$2 for THE AUTOMOBILE for 1903.

I notice in the last issue under the head of "Air Pressure on Gasoline," a letter calling for an answer from a user of steam propelled vehicles. I am using one of that type and use the Phelps system of pumping the gasoline and like it very much better than the air pressure. It has many advantages and hardly a disadvantage, and I consider it safer to use.

JOHN GAGE.

Herkimer, N. Y.

Chicago Club Growing Rapidly.

Special Correspondence.

CHICAGO, Jan. 10.—At the regular monthly meeting of the Chicago Automobile Club, held Thursday evening, January 8, eleven new members were added to the rapidly growing list, which now numbers upwards of 170.

Club members are at present especially interested in the forthcoming automobile shows in New York and Chicago. A large number of enthusiasts will visit the former, but naturally the Chicago show, which opens on February 14, attracts most attention here.

A notable step has been taken by the new officers of the club in securing the services of a capable manager to take active charge of the club house.

MOTOR BOATS

LAUNCHES AT PARIS SHOW MARK IMMENSE PROGRESS.

REFINED MOTOR CONSTRUCTION.

Feature of the Section Was the Fast Launch
"Mercedes," With 35-Horse-Power Engine—
Combination Propeller and Rudder—One American Concern Represented.

The relation between the motor car and the launch is much closer in France than in this country, and the development of the former has served as a strong stimulus in the improvement of the latter. While the gasoline marine motor in this country has been in common use for some years, even before the motor car was popular, it is only through the perfection of the automobile motor and its application to launches that the gasoline launch has come into general use in France. It thus happens that the ordinary gasoline marine motor sold in this country—strong, heavy, durable and adapted for all-around use—is little known in France, the launches there being equipped with the light, elegant, high-speed motors, such as the De Dion, Panhard, Mercedes and Aster. While the line of improvement on this side is calculated to give immediate and practical results, the French experiments will ultimately be of great value in decreasing the weight and increasing the efficiency of the marine motor.

The launch exhibit of the French show marked an immense improvement in both hulls and motors of the similar exhibits of 1900 and 1901, and the number of the exhibits and the attention which they attracted in spite of the elaborate display of their wheeled rivals promises a new interest in launches and launch racing in the future. The noted *Mercedes*, designed by Chevreux and built by Lein, at Perreux, was the feature of the Show. With her Mercedes motor of 35 horse power she has made a record of 36 kilometers, or 22.35 statute miles. The lines of the model show the same perfection and refinement of designing as is conspicuous in the motor.

A very handsome launch, *Elsie*, was exhibited by the builder, G. Seyler, the design being by Glandaz. She is 26 feet 3 inches long and 6 feet 10 inches wide. She is intended for cruising, but the lines are very fine and the whole hull is beautifully shaped. A cabin house 8 feet 8 inches long is placed well forward, fitted with two sofa berths, bureau and lockers. The motor, under a glazed hood, is located about amidships and abaft it is a water-tight bulkhead separating the motor space from the cockpit, where the steering wheel is located. The reversing and slowing of the motor are accomplished by means of foot pedals, and all the levers for the control of the motor are carried within reach of the

wheel. The hull is planked with 11-16-inch cedar and the deck is of the same thickness of pine; the frame is of oak, the coamings of mahogany and the bulkheads of tulip and mahogany.

The Société du Propulseur Universel Amovable exhibited its propelling device, of a form known in this country, the propeller being fitted at the outer end of a lever hung over the stern, acting at the same time as a rudder and being removable at will. The device has been tested on both pleasure and working boats in France and good results are reported. One test with a lighter 65 tons net, the motor of 12 horse power using refined petroleum, gave a speed of 7 kilometers with a consumption of but 4 liters (0.88 gallons). It is proposed to try two of these motors, with the same fuel, on a lighter of 285 tons. The company also showed a marine motor of 80 horse power, four cylinders, weighing but 250 kilos (550 pounds).

A very beautiful launch constructed by Tellier for the Sultan of Morocco was shown. The dimensions are 21 feet long 4 feet 11 inches wide and 2 feet 7 inches deep, double planked with mahogany. The motor, De Dion, is of 8 horse power and placed amidships under a glass hood. The wheel is near at hand, but all the levers are on the wheel itself, both motor and launch being thus under the control of one man. The exhaust is under water.

Dalifol & Co. exhibited two launches, *Diavolo* and *Rikiki*, fitted with the Abeille motor, recently illustrated in THE AUTOMOBILE. The latter, fitted with circular seats and canopy, last year received the prize of the Helix Club for the best "canot de promenade."

A novelty in the way of a sheet steel hull was shown in the *Marthe* by E. T. Amblard & Co., of Dieppe. She is 25 feet long, and of handsome model, but intended rather for pleasure running than for racing. The *Chemineau*, exhibited by Goutallier, is 23 feet long, 4 feet 11 inches wide and 2 feet 3½ inches deep, with a fore deck 8 feet long and an after deck 3 feet 3 inches long; the motor, De Dion, of 9 horse power, being partly under the fore deck. The speed is 8½ miles. At the same stand was exhibited a davit launch with sail.

The Aster motor is built with one, two or four cylinders, of 6, 12 and 16 horse power. The two-cylinder works up to 1,000 revolutions. A special feature of these motors is variation of the speed, from 650 to 1,000 turns, by the automatic control and independent regulation of the throttle.

But one American concern was represented, the Eagle Mfg. Co., of Torrington, Conn., which exhibited two launches fitted with its motors. The exhibit is favorably commented on by the French papers.

Sportsmen's Show in the Garden.

The ninth annual Sportsmen's Show at Madison Square Garden, New York, will open on February 21 and continue

until March 7. Due attention will be given as usual to the marine exhibit, and a good showing of motors and launches is expected. Spaces for this part of the exhibit have been provided along the center of the north side and also on the south side near the Fourth avenue end. The management of the show is in the hands of J. A. H. Dressel, 313 Broadway, to whom all applications for space should be made.

Gasoline Launch for Spain.

There is now on the ways of the Daimler Mfg. Co., Steinway, Long Island City, a very handsome cabin launch, which, after launching, will be shipped by steamer to Gibraltar. The launch was built to the order of Carlos Larios, of Gibraltar, a wealthy Spanish merchant, who has named her *Ave*.

She is 49 feet over all, 8 feet 6 inches breadth, and 3 feet 6 inches draft, including a keel of about 6 inches. The hull is planked throughout with teak, with plank-sheers, deck fittings and cabins of the same wood; with bronze fittings and brass railings, the yacht has a very handsome finish.

She has a raking stem, a whaleboat stern and a good freeboard. A bow trunk covers the forward cabin, fitted with sofas; the toilet room and pantry being just aft. The motor is a 25 horse power, four-cylinder Daimler in which many improvements over the old models have been made. It is fitted with both electric and tube ignition. The engine room has a bow cabin house and the flush deck between this and the forward house is fitted to be enclosed by an awning and side curtains, making a comfortable resort in hot weather. The hull is coppered.

Auxiliary Schooner Yacht.

Arthur D. Story, of Essex, Mass., has been commissioned to build a handsome auxiliary yacht for Davis B. Smith, of Gloucester. The vessel is to be schooner rigged, 65 feet over all and will be equipped with a gasoline engine. She is modeled for a cruising craft with plenty of room and conveniences, yet is expected to develop moderate speed. She will be used for cruising exclusively and will be fitted in approved style to conform with her owner's ideas. Work has been started on the craft under the supervision of John Prince Story.

A New Auxiliary Yawl.

The Gas Engine & Power Co., of Morris Heights, New York, has now on the stocks an auxiliary yawl designed by C. L. Seabury, of the company, for J. H. Smedley, of Detroit. She will be 57 feet over all, 41 feet water line, 14 feet breadth and 4 feet 6 inches draft, with a gasoline motor for the auxiliary power, the rig including mainsail, jib, forstay sail and mizen.

INDUSTRIAL

CLEVELAND MAKERS PLAN COMBINED SHOW SHIPMENT.

TRAIN LOAD OF EXHIBITS.

Reduced Express Rates to New York and Gratuitous Advertising the Main Objects—Out-of-Town Makers Interested in Local Exhibition—New Retail Stores Opened.

Special Correspondence.

CLEVELAND, Jan. 10.—It is probable that a unique express shipment will be made from this city next week—a whole train load of automobiles bound for the New York automobile show. Sales Manager McCrea, of the F. B. Stearns Co., is responsible for the scheme, whereby he believes he can save the several local companies considerable money and at the same time secure some good advertising for all of them. The plan is to charter several cars, a train if necessary, and ship all the exhibits of local manufacturers in one lot; also to decorate the train with banners and incidentally secure some photographs for the daily and trade press. There are so many manufacturers here who propose to exhibit at New York that their combined display will make a very large shipment. They have thus far taken kindly to the proposition, but there is a possibility that the express companies may not, since they are certain to get the business any way and do not show much disposition to make rates; however, Mr. McCrea has strong hopes of putting through the project.

PROGRESS TOWARD LOCAL SHOW.

George Collister, secretary of the Cleveland Automobile Association, states that all but a very few of the spaces for the coming local exhibition have been applied for and he is satisfied that at the New York show there will be more applications than can be filled. While some of the out-of-town manufacturers have declined to exhibit on the ground that they have no local representation here and do not care to depart from the policy of the National Association, it is notable that several of these concerns have intimated that they may take space at the eleventh hour if they can secure some sort of representation before that time. It is stated that an eastern representative of a French machine has arranged to display his car and there will be a decided novelty in the shape of a large car built by Henry Wick of Youngstown, O. This is equipped with a four-cylinder gasoline motor developing 35 horse power.

NEW STORES IN "NEW CENTER."

Two new retail establishments were opened for business last week, one by the General Automobile & Mfg. Co., and the

other by the Ohio Motor Car Co. Both are in the "New Center," the former in the Y. M. C. A. Building, corner of Erie and Prospect Streets, and the latter in the Pythian Temple, 314 Huron Street, not far from the new Winton retail establishment. The General company came near losing its home the day after it moved, as the Y. M. C. A. Building was badly damaged by fire last week. The Ohio company is showing samples of the Northern and expects samples of the International gasoline car in time for the Cleveland show. At the General store is displayed a number of 1902 models.

SYSTEMATIC WINTON OUTPUT.

Complete vehicles are coming through the Winton factory at the rate of about four a day. In a few days this output will be increased to five per diem. With more than 500 men at work and every department in operation, the huge touring cars are being produced as systematically as nuts or bolts are run through an automatic machine. Recently the writer saw thirty complete cars ready for shipment and as many more in advanced stages of construction. The sales on 1903 machines already aggregate more than 350 and the earliest delivery now promised is April 15.

FIRST AUTOMOBILE SHOW IN BUFFALO TO OPEN MARCH 9.

Special Correspondence.

BUFFALO, Jan. 12.—W. C. Jaynes, of the Jaynes Automobile Co., and F. J. Wagner, have completed arrangements for holding an automobile and sportsmen's show at the Buffalo City Convention Hall during the week of March 9. Mr. Jaynes is secretary and treasurer and Mr. Wagner is manager.

The big hall has been divided into sixty-six spaces, most of which are fifteen by fifteen feet in size, and diagrams and rate cards are now being sent out. Mr. Jaynes stated on Saturday that although the diagrams had been out but a few days nearly half of the space had been contracted for and he believed the coming week would see many of the choicest locations taken, as nearly all of the prominent makers had signified their intention of making displays.

Buffalo is one of the most enthusiastic motor vehicle cities in the country, and it is the belief of the promoters that the show will be a success, for the reason that the city has never had anything of the kind.

Chicago Show Space Well Taken.

Special Correspondence.

CHICAGO, Jan. 10.—All the center spaces and two-thirds of the wall spaces in the Coliseum Annex have been taken, in addition to the entire main building, for the Chicago Show, which is to open February 14. Very few representative manufactur-

ers, even among those of the East, have failed to secure space, and some have found it necessary to accept less than they desired in order to accommodate others. The exhibits will be more elaborate than ever, and judging from the demand for information relative to electric signs, displays of that character will be numerous.

Reduced railroad rates have been secured from all roads in the Central, Western and Trunk Line Passenger Associations, on account of the good roads convention of the National Association of Automobile Manufacturers. These rates will allow practically all of the trade of the country to visit Chicago at the one and a third round-trip rate with the exception of those from the Pacific coast.

The second floor of the Annex will be fitted up by the N. A. A. M. and the Chicago Automobile Club for the entertainment of visitors during the week, and here also will be held the sessions of the Good Roads Convention.

EXECUTIVE COMMITTEE NOMINATIONS OF N. A. A. M.

Nominations for members of the executive committee of the National Association of Automobile Manufacturers, to be voted upon at the annual meeting to be held on January 23, were made at a committee meeting held on January 7. The nominations announced were as follows: H. Ward Leonard, Windsor, T. White, Lucius T. Gibbs, I. H. Page and T. S. Fish. The term of office is three years. These are all renominations, except Mr. Page, who is to take the place of Walter C. Baker. The executive committee elects the president.

A special committee was appointed to investigate suggestions made for standardizing lamp brackets on automobiles. Lengthy consideration was given to the constitution and by-laws and several amendments were drawn up.

Invitations to attend the Good Roads Convention of the association at Chicago during the Coliseum Show, February 14 to 21, have been sent to all United States Senators and Representatives and to all citizens who are prominently identified with the highway improvement movement.

The Ajax Motor Vehicle Co., of New York, and the General Automobile & Mfg. Co., of Cleveland, were elected to active membership, and the Badger Brass Mfg. Co., of Kenosha; the New York Edison Co., the Fisk Rubber Co., K. Franklin Peterson, F. W. Defoe and the C. T. Richards Co. to associate membership.

Winthrop E. Scarritt, president of the American Automobile Association, has just been elected to the presidency of the Pan-American Motor Co., of Mamaroneck, which recently increased its capital stock and bought the Marion (N. J.) plant of the defunct Automobile Co. of America.

BOSTON DEALERS FORM PERMANENT ORGANIZATION.

TO POPULARIZE AUTOMOBILES.

Objects Are to Co-Operate to Prevent Adverse Legislation and to Consider Advisability of Holding an Automobile Show in March and a Race Meet in the Spring.

Special Correspondence.

BOSTON, Jan. 12.—Local dealers started an active campaign last week to arouse widespread interest in automobile matters in Boston this year. Fifteen of them, representing all but three of the leading automobile establishments in the Hub, met in the Pope Building on Monday afternoon and voted to organize an association. After choosing committees, which were at work all Tuesday afternoon, they met again on Wednesday to hear the committee reports and to effect permanent organization.

W. E. Eldridge, F. E. Randall and A. T. Fuller sent out the call for the first meeting. It stated as the specific objects for organization the union of forces to co-operate in preventing hostile legislation at the State House this winter, the consideration of the advisability of having an automobile show in Boston next March, the consideration of the advisability of having a race meet for automobiles in the spring, either in conjunction with the Massachusetts Automobile Club or separately, and such other activities as may stir up more popular interest in the automobile in this section.

The dealers thought the idea of a show ought to be carried out. H. E. Marvin, of the Electric Vehicle Company, was made temporary chairman, and C. I. Campbell, of the Mobile Company, was made temporary secretary. The committees were as follows:

On a Boston automobile show: W. E. Eldridge, F. E. Randall, George Gordon Reed.

On constitution and by-laws: W. E. Eldridge, C. I. Campbell, A. T. Fuller, George G. Reed, C. H. Wilson.

On adverse legislation: Harry Fosdick, J. W. Dingley, A. J. Coburn.

On race meet: Kenneth A. Skinner, Charles Bates, F. E. Randall.

The start in this matter of an association has been made with considerable enthusiasm, and several conferences which the dealers have had lately with the Massachusetts Automobile Club have done much to harmonize the ideas of the trade and the club men.

Englishmen Like American Cars.

DETROIT, MICH., Jan. 10.—R. Reynold Jackson and Mr. Naistsmith, comprising the firm of R. Reynolds Jackson & Co., proprietors of the Sterling's London Automobile Agency, of London, England,

are in this city. Mr. Jackson says they are looking over the American market for automobiles for the English trade and expect to soon ship a car load of vehicles to London. He says they have thus far been much pleased with what has been seen of new American cars, which are much quieter running and more simple in construction than either French or English machines. He spoke well of several of the machines made in Detroit.

American Rochet-Schneider Cars.

Henry C. Cryder, formerly receiver for the Automobile Co. of America, whose plant in Marion, N. J., has just been purchased by the Pan-American Motor Car Co., of Mamaroneck, N. Y., is president and general manager of a new company just incorporated at Albany under the name of the Moyea Automobile Co., with \$100,000 capital stock, for the purpose of manufacturing motor vehicles. The new company is reported to be seeking a site for a factory in Middletown, Conn., or in Atterbury, Mass. The name Moyea is an Indian word meaning swift running.

When Ernest Cuenod, of the Automobile Club of Switzerland, returned home last summer, he left at the Gasmobile factory the Rochet-Schneider car in which he won the Roslyn Hill hill climbing contest in the Long Island Automobile Club's April endurance contest, and since then work has been progressing in the Marion plant in designing and building an American copy of the French machine. The new car, which is of 16 to 18 horse power, was recently completed, and on January 5 was taken out on the roads of Long Island for a comparative test with the original Rochet-Schneider, which is of 12 to 16 horse power. The test is asserted to have demonstrated superior speed for the American copy. It is hinted that the new company may build a special car on these lines to be entered in the Gordon-Bennett Cup Race. Several well-known automobilists and capitalists formerly interested in the Automobile Co. of America, including Sidney Dillon Ripley, are interested in the Moyea concern.

Remington Company Reorganization.

The work of reorganizing the Remington Automobile & Motor Co., of Utica, N. Y., is to be taken up at once and pushed as rapidly as possible, a meeting of the stockholders, held on January 5, having voted to direct the drawing up of the necessary legal papers for the stockholders and creditors to sign. Two of the largest creditors were present at the meeting. After a report on the inventory and as to the attitude of the creditors was read, the stockholders voiced their approval by vote, and it seemed practically assured that the creditors will consent to the reorganization plan. The matter was discussed fully and a thorough understanding was reached.

GREAT ACTIVITY EVIDENT IN AKRON TIRE FACTORIES.

EXTENSIVE SHOW PREPARATIONS.

Fall Threat of a Labor Tie-Up Averted and Wages of 2,400 Employees Increased 10 Per Cent—Intense Interest in Automobile Tire Improvements—Rubber Prices Higher.

Special Correspondence.

AKRON, O., Jan. 10.—Manufacturers of automobiles and other rubber tired vehicles have been keeping a sharp eye on the threatened labor trouble in Akron's largest factories, for if these concerns should have to close down, as the Morgan & Wright factory in Chicago was obliged to do, it might very seriously inconvenience them. The danger was at its height during the fall, when John Mulholland, president of the Allied Metal Mechanics, was here and undertook to declare an ultimatum to the B. F. Goodrich and the Diamond Rubber companies to force a recognition of the union. Since then the Amalgamated Rubber Workers' Union has been formed, and rubber workers affiliated with any union are now a part of the latter organization. It embraces branches in all the principal rubber manufacturing centers. The danger of a strike or lockout has passed, so far as Akron factories are concerned, and though the union is still active and reports gains in membership, each company will undoubtedly be able to deal with its own employees in a way that will prevent all friction.

All the rubber factories are busy, and this applies especially to those which manufacture tires, most of them working double shift. Employees are generally well-satisfied and all danger of labor troubles being over, the B. F. Goodrich Company announced on January 8 that the wages of all employees would be advanced 10 per cent, to go into effect immediately. The advance was welcomed by 2,400 employees. In other rubber factories there have been advances in wages, though not in the same general way, affecting every workman, whether in factory or office.

PREPARATIONS FOR THE SHOWS.

Never before have the tire manufacturers made such extensive preparations for their representation at automobile and vehicle shows. The literature which has been prepared to attract the interested is unusually attractive and in volume breaks all records.

Although the demand for general vehicle tires is great, it is nevertheless true that the larger rubber factories are bending their first and greatest efforts toward the making of automobile tires. The search for means of improvement and for the improvements themselves, goes on unceasingly. The inquiries received shows that the trade in general is watching with

much interest for the announcement of results.

RUBBER PRICES STILL RISING.

January finds the price of crude rubber still in the ascending scale with quotations for the best grades higher than they have been for a year—90 cents and above per pound. The advance is of much more immediate interest to the manufacturers of rubber than the buyers of tires, however, for to a large extent the contracts for this year have been closed and it is "up to" to makers of the tires to deliver the goods. Few of the manufacturers have carried heavy stocks of crude rubber, and where the advance in price is going to stop is fast becoming an absorbing question. Reports received here show that the receipts of crude rubber at the exporting points are below the average in quantity.

C. H. WHEELER TO RETIRE.

President C. H. Wheeler, of the India Rubber Co., best known to manufacturers and tire men as the inventor of solid endless tires and other tire improvements, is soon to leave the rubber business. His resignation will be effective upon the election of his successor some time this month. There is no doubt that L. D. Parker, of the Hartford Rubber Works Co., is to succeed him. The Rubber Goods Mfg. Co., which controls the Hartford, India and other companies, is putting Mr. Parker at the head of these concerns with a local manager in each. W. L. Wild will probably be manager of the India factory here. Mr. Wheeler will devote his time to the Cleveland, Akron & Southern Fast Line Railway Co., which is about to build a suburban electric road from Cleveland to this city.

EUROPEAN TIRE RIGHTS GRANTED.

The Colonial Rubber Co., which holds the European rights to the Swinehart cross-wire tire patents, outside of Great Britain, has closed contracts for the manufacture of these tires on royalty for France, Spain, Portugal, Italy and Austria-Hungary, with Paris and Vienna manufacturers. These tires have found considerable favor for use on heavy, slow-going automobiles and public conveyances of this description. The Firestone Tire & Rubber Co., which controls the patent outside of Great Britain and Europe, has lately built a factory for the manufacture of its own goods, the B. F. Goodrich Co. having manufactured them on contract heretofore. The Goodrich company makes the tires also on royalty for the American trade and controls the patent in Great Britain.

The Long Island Railroad Co. is having a number of automobile trucks built to be used in its express service, it is reported. The trucks are to be run up-town on Manhattan Island from the James Slip ferry to the Thirty-fourth Street ferry to pick up goods.

NEW AND ENLARGED ESTABLISHMENTS IN PHILADELPHIA.

Special Correspondence.

PHILADELPHIA, Jan. 12.—Automobiles as postal distributing and collecting vehicles are a success, in the opinion of Postmaster Clayton McMichael, of this city. For several days preceding Christmas Manager Percy L. Neel, of the Quaker City Automobile Co., which handles the Oldsmobile in Philadelphia and adjacent territory, placed at the disposal of the local postal authorities two of these runabouts and experienced operators to run them, and the ease and facility with which they handled the heavy work assigned them greatly pleased Postmaster McMichael and gratified Manager Neel.

The Quaker City Automobile Co. has now the largest storage, repair and supply station in this city, the addition of the building north of its original location giving it an establishment 95 x 200 feet, four stories high, and admirably adapted for the purposes of the company. The entire territory of Eastern Pennsylvania, Southern New Jersey and Delaware will be cared for from this establishment. Manager Neel has already placed twenty-four sub-agencies in this territory.

A force of fifteen men will be kept employed throughout the winter in repair work and in putting improved carbureters and braces in the more than 200 Oldsmobiles now used in Philadelphia. These braces will enable the axles to sustain great additional strain but will add but a few pounds to the weight of the vehicle. An office and demonstration force of six men and a wash room corps of three will be maintained through the winter and will probably be doubled with the advent of warm weather. Of the ninety-five vehicles at present occupying "stalls" in the storage department, upward of forty belong to local physicians.

Manager Neel has just returned from a western trip, in the course of which he concluded arrangements with the International Motor Car Company for the exclusive agency for its vehicles in Eastern Pennsylvania, Southern New Jersey and Delaware.

Banker Brothers will be installed in their new quarters at 629-633 North Broad Street within a fortnight. The refitting of the interior of the large building is completed and with the installation of the office furniture and fixtures the whole establishment will be in shape for the formal opening to the public on January 30 and 31.

Banquet to the Trade.

Private entertainment has long been recognized in practice as a valuable lever for overcoming the "starting friction" in new business relations, but banquets and receptions of a more public order have only lately

found their way to favor for the same purpose, though the frank avowal of their object renders them quite unexceptionable. It is in this spirit that the Hyatt Roller Bearing Company—as pioneers in a construction of bearings with which not all automobile builders are acquainted—has taken advantage of the trade gathering for the Madison Square Show and issued invitations to the leading trade members to spend a social evening on Wednesday, January 21. This arrangement made by the company's secretary, Peter S. Steenstrup, provide for a banquet at Mouquin's uptown hostelry in New York City, followed by a box party at Weber & Fields, where Mr. Steenstrup has engaged most of the lower boxes, besides inducing the managers of the theater and Charles Bigelow, who is one of their leading comedians and himself an ardent motorist, to give the show a decidedly automobile flavor.

Souvenirs for the occasion are being prepared by Arthur Tyler Merrick, and it is safe to say that all the trade flavor in the event will be limited to a few gentle hints of "flexible bearings" in his artistic productions.

A Modern Automobile Plant,

KOKOMO, IND., Jan. 10.—The new factory buildings of the Haynes-Apperson Co. have been completed and occupied and are now running full time. Their completion makes this one of the largest automobile manufacturing plants in the country built expressly for motor vehicle construction. The three main buildings, which are two stories high, cover an area of about 80,000 square feet. The entire lower floors of the first and third buildings are immense machine shops, having solid cement floors and ample light and heat.

The assembling department is on the ground floor of the central building of the group, where the various parts brought from the other shops are put together and the vehicles are got ready to be taken out on the road and tested. The wood working department, where the finished bodies are made from the rough lumber, is on the upper floor of the first building. From here the bodies go to the painting department, which occupies all of the second floor of the central building.

Besides the three main buildings, the plant includes a foundry, blacksmith shops and a tinshop immediately adjoining, and a nicely furnished office building fronting the street. A novel feature of this building is a reception room for visitors, who have at their disposal lounging chairs and a writing desk. In this room may be seen a large number of blue ribbon certificates, gold medals and silver cups awarded Haynes-Apperson cars for their achievements in the various reliability contests held in this country.

New Enterprises.

The National Motor Car Co. has been chartered in Dover, Del., with \$250,000 capital, to manufacture motor vehicles. The incorporators are all residents of Washington, D. C.

The Bristol Motor Car Co., of Bristol, Conn., which recently increased its capital stock from \$10,000 to \$40,000, will occupy a factory in Forestville for the manufacture of automobiles.

Articles of incorporation have been filed by the Pence Automobile Co., of 836 Lumber Exchange Building, Minneapolis. The objects are to manufacture, repair and deal in automobiles. The capital stock is placed at \$25,000. The incorporators are Harry E. Pence, D. Pence and John W. See.

Permission to manufacture automobiles and tubular steel wheels is granted in a charter issued at Springfield, Ill., to the Streator Automobile & Mfg. Co., of Streator, Ill. The capital stock is fixed at \$25,000, and the incorporators are Bartlett H. Campbell and John B. and Charles F. Lott.

Incorporation papers have been filed by the Premier Motor Mfg. Co., of Indianapolis, with the object of engaging in the sale of motor cars and gas engines. The capital stock is placed at \$50,000. The incorporators are Harold O. Smith, John E. Smith and George A. Weidely.

A number of business men of Bay City and Saginaw, Mich., have organized the Valley Auto Co., to operate automobile stores and repair shops in the two cities, and may later engage in the manufacture of motor vehicles. The company will be ready for business on February 1. F. H. Fenner will be manager.

The firm of Binney & Burnham, manufacturers of steam vehicles in Boston, has been dissolved and a new partnership has been formed under the name of Lyman & Burnham for the manufacture of gasoline cars, with steam cars as a side issue. Two models of tonneau touring cars will be placed on the market by the firm early in the spring.

The Cortland Automobile Co., has been formed in Cortland, N. Y., to deal in automobiles of all kinds and in motorcycles. It has leased the building on Main Street formerly used as a State armory, giving it 220 by 80 feet floor space, all on the ground floor, for show room, storage, repair shop and charging plant. H. K. Gillette is president of the new enterprise and Frank S. Bliven is manager.

The Ohio Motor Car Co., recently organized in Cleveland, Ohio, by C. A. Post, president; J. R. Post, vice-president; M. A. Post, secretary; G. F. Russell, secretary, and R. H. Magoon, manager, has leased the ground floor and basement of the Pythian Temple Building, in Cleveland, to be used as an automobile sale and repair station. The company has the agen-

cy for the Toledo steam and gasoline vehicles and the Northern runabouts.

It is rumored, but the rumor has not been verified, that an automobile factory will be opened soon at Pullman, Ill., which will devote itself to the exclusive manufacture of light gasoline runabouts. Rumor places H. H. Gross, a well known Chicagoan, at the head of the enterprise.

Trade Brevities.

The Cleveland Ball & Screw Co. has recently removed its offices from the Arcade Building in Cleveland to 227 St. Clair Street.

William Hibbard, a popular automobilist and salesman, has accepted a position with the Studebaker Bros. Mfg. Co. and now has charge of its automobile sales department in Chicago.

Colonel K. C. Pardee, who has control of the output of the American Motor Carriage Co., of Cleveland, reports having sold most of the 1,000 vehicles which this company hopes to produce during the present year.

B. C. Hamilton, formerly with the Locomobile Co. of America and latterly with a Chicago company doing experimental work on a gasoline machine, has accepted a position with the Electric Vehicle Co. and will be on the road for it this season, traveling out of Chicago.

Manager Tucker, of the Winton Motor Carriage Co.'s Chicago branch, is making a number of changes in that establishment which will greatly increase the accommodations, giving nearly three times the floor space formerly used. A new freight elevator is being installed.

Manager C. G. Wridgway, for Banker Bros., has sent out invitations to members of the automobile and daily press in New York to be present at the formal opening of the firm's fine new automobile salesroom and repair station at 141-143 West 38th Street, New York, on Thursday evening, January 15. The opening includes also a banquet.

A branch of the International Automobile & Vehicle Tire Co., of Milltown, N. J., has been opened in Cleveland by Manager S. A. Rigdon, and it will be in charge of D. A. Foote, who will have Ohio, Kentucky and West Virginia as his territory. His line will include all kinds of vehicle, automobile and bicycle tires and he will carry a large stock on hand all the time. The Cleveland headquarters will be at 347 Huron Street, where a good room has been secured. The repair department has been installed and all work of that kind in the territory will be taken care of from Cleveland. S. A. Rigdon was formerly with the Goodyear people, but is now sales manager for this house.

The Githens Bros. Co., at 1412-14 Michigan Avenue, Chicago, is making exten-

sive improvements and additions to its quarters, which, when completed, will give the company one of the largest and most convenient establishments in the city. A complete change in the line of vehicles carried has been made for the coming year, the company offering the Oldsmobile, Searchmont and the Buffalo electric.

The Ralph Temple & Austrian Co. has leased the storeroom at 1408 and 1410 Michigan Avenue, Chicago, formerly occupied by the now defunct Milwaukee Automobile Co., and expects to have a stock of vehicles installed by February 1. The company is not moving from the quarters on Wabash Avenue, but will hereafter conduct both stores, the move being made necessary by the large increase in business, present and prospective.

The Hartford Rubber Works store in Cleveland has been removed to 77 Bank Street, and the Diamond Rubber Company's branch, heretofore on Euclid Avenue, is moving into the quarters in the Pythian Temple, vacated by the Hartford company. F. E. Taylor, who has been on the road for the Diamond people, will be in charge of the new store, which will be one of the largest distributing branches in the country.

The Cadillac Automobile Co. of Illinois, of which R. H. Croninger is manager, expects to move into a new building on Michigan Avenue, just south of Thirteenth Street, Chicago, on January 20. The new building is being erected for this company and will, of course, be well suited to the needs of the automobile business. The new company will handle the Cadillac as a leader and will also carry the complete line of the F. B. Stearns Co., of Cleveland.

An interesting hill-climbing contest between H. W. Walters' 35-horse power Mercedes and an 8-horse power Stevens-Duryea, driven by Charles Martin, was held on Fort George Hill, New York, recently. This hill is half a mile long and has a maximum grade of from 14 to 16 per cent. While the Stevens-Duryea was no match for the high-powered German machine, it held its own "neck and neck" about half way up, when the Mercedes drew away, finishing a 100 feet or so in the lead.

A pleasing evidence of good fellowship was the presentation on Christmas of a handsome chair to Elwood Haynes, president and general manager of the Haynes-Apperson Co., of Kokomo, Ind., by the employees of the factory. It will be remembered that last winter the Haynes-Apperson Co. sent all the heads of its departments to the Chicago automobile show, and that upon the occasion of the opening of the new factory building last fall the company gave a ball to its employees, the grand march being led by Mr. and Mrs. Haynes in an automobile stan-

NEW VEHICLES

The Orient Buckboard.

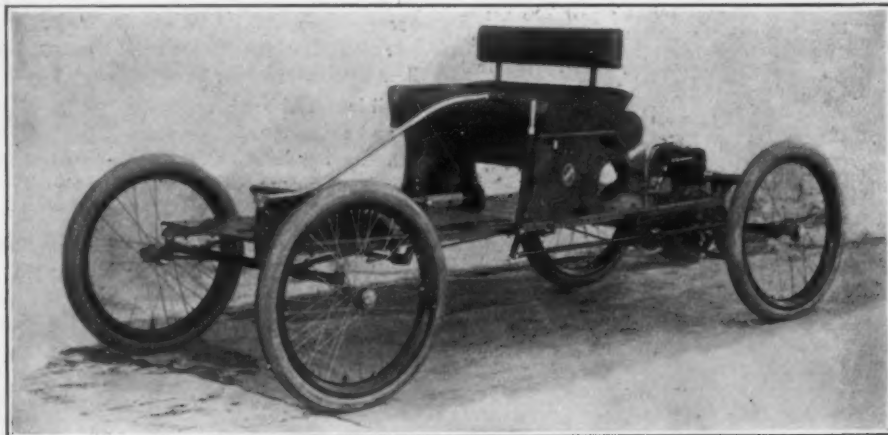
The Waltham Manufacturing Company some time ago conceived the original idea of applying the motor principle to a buckboard, that handy colonial style of vehicle which came into favor in the olden days when carriage steel springs were not always obtainable when wanted. The result of the Waltham people's conception is exhibited at the New York Show and will doubtless attract much attention. The motor attachment is as simple as that of the Orient motor bicycle, while the vehicle accommodates two persons side by side, the whole constituting an extremely light style of automobile, and yet one which can endure the knocks of the road, as the entire weight of the motor mechanism comes directly over the rear axle. The motor is of four horse power and air-cooled by a blower mounted on the engine shaft. Being subject to throttle control by pressure on a pedal and to timing of the electric spark by a lever at the left of the seat, the motor drives the vehicle, which, all told, weighs only 350 pounds, at any speed between four and thirty miles per hour and up grades of as high as 17 per cent., with two persons up. The wheel base is long and the buckboard is flexible and these two factors produce easy riding. The finish is mostly in polished natural wood and maroon enamel, with nickel-plated trimmings.

Columbia Electric Hansom and Truck.

Two of the most striking models of the nine vehicles which will be exhibited in the annex or restaurant at Madison Square Garden by the Electric Vehicle Co., of Hartford, next week are the electric hansom and the electric truck herewith illustrated. The former is designed for private service. The body design departs

somewhat from previously existing models, the top being more commodious and having increased window spaces. The interior furnishings include mirrors, speaking tube connecting with driver's seat, side pockets and an incandescent lamp in dome fixture. The running and operating parts are similar to those of the broughams made by this company. The motors afford a speed of fourteen miles and the batteries a mileage of forty miles on one charge. A special feature of the vehicle

of 5 horse power. A special feature is the vertical controller operated by a small wheel beneath the steering wheel. There are two powerful foot operated brakes, the regular brake being of the band type acting on the outside of the drum, and the emergency brake of the internal expansion pattern. There is also an electric brake in the controller. In addition to these safety appliances, there is a heel kickout emergency switch by which the current can be cut off instantly. The underslung



ORIENT 4-HORSEPOWER BUCKBOARD.

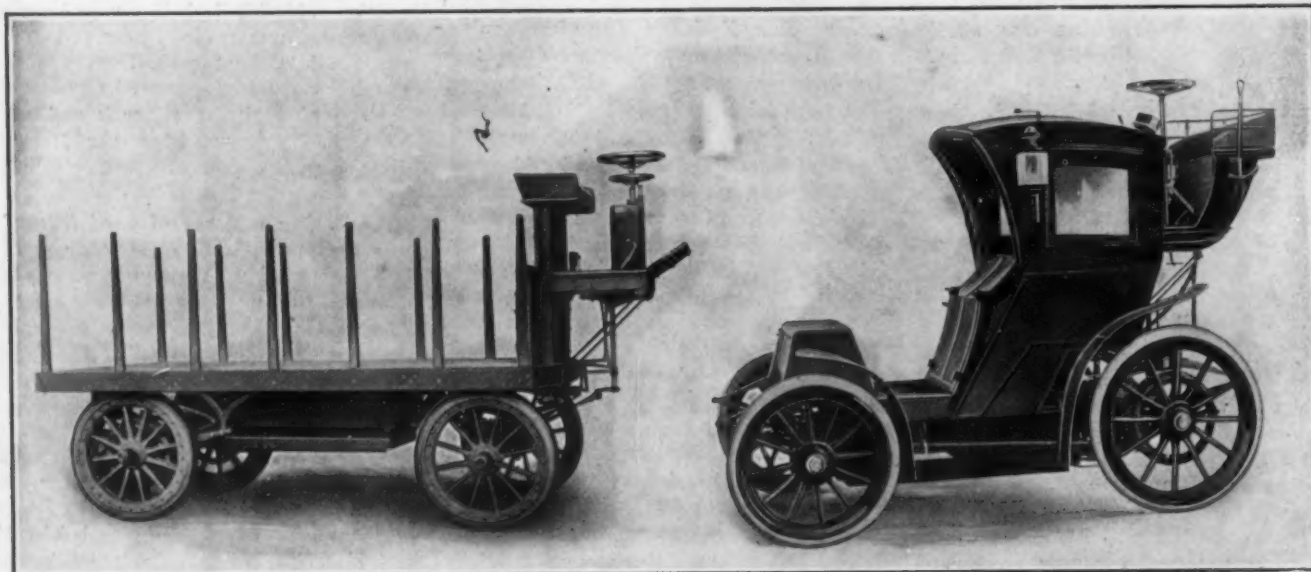
is the wheel steering arrangement, which is entirely new in hansom construction.

The truck is the latest type of the Electric Vehicle Co.'s commercial vehicles. The chassis, which will accommodate any kind of a platform or body, will be furnished in two sizes having load capacities of 10,000 pounds and 5,000 pounds, respectively, and a smaller size for delivery wagons and other vehicles for business and institutional uses. The running gear is of the reachless type with three-point body suspension. The truck shown is of two and one-half tons capacity and has two motors, each developing a maximum

batteries are put in from below and are held by an ingenious automatic device which reduces the trouble of changing batteries to the minimum. There are four speeds forward of 2, 4, 6 and 7 1-2 miles per hour, respectively, and three reverse speeds.

Grout Steam Tonneau.

The novel looking tonneau here shown with a "cow-catcher" in front, is the latest model from the factory of Grout Bros., of Orange, Mass., who announce that they are now prepared to receive orders for this machine. It is a steam touring car de-



LATEST MODELS OF COLUMBIA ELECTRIC TRUCK AND HANSOM.

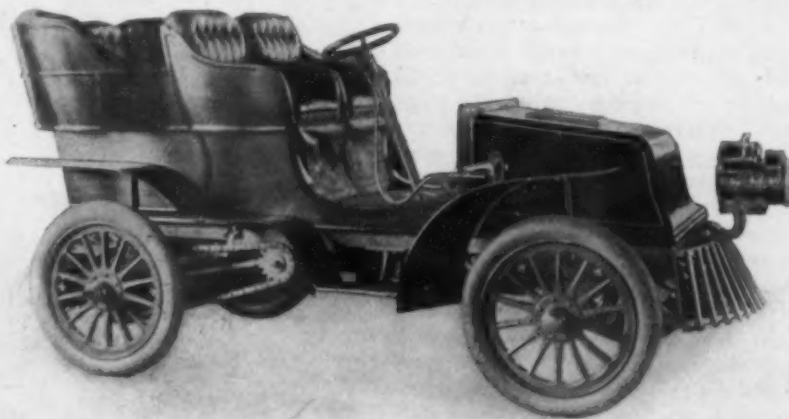
signed on the lines of the gasoline tonneau. The boiler is located in front and the engine is placed horizontally under the footboard, the power being transmitted from a jack shaft by two chains to the drive wheels. The car is provided with a steam condenser, arranged to resemble the pilot of a locomotive. By the provision of the condenser the car can be run 100 miles without attention. The boiler cannot be burned out and every improvement known to the steam car that has by actual experience been proved valuable has been incorporated in the Grout touring car. The tonneau seats three persons and the machine complete weighs between 2,500 and 3,000 pounds. It is fitted with powerful brakes and 32 by 4-inch tires. Trimmings are in polished brass, and the car is fully equipped with lamps, handles and other fixings.

Locomobile 16-Horsepower Gasoline Car.

The Locomobile Company's 16 horse power gasoline motor touring car is modeled after recent European practice with certain modifications toward simplicity and for the better suppression of noise and vibration. The steel frame upon which the carriage body rests and to which the engine with all machinery of the car is bolted, is of special design and patented. The complete chassis does not contain any wood except the dashboard, which carries the sparking coils, circulation gauge, automatic switch and a kerosene pump for cleaning

vaporizer (carbureter) operates on the siphon and pulverization system and is kept at an equable temperature by hot air from around the exhaust pipe. The water cooling is by centrifugal geared pump. Direct driv-

next day crossed Staten Island in thirty minutes. Since then the car has been driven 500 miles, including a trip from Utica to Syracuse, a distance of 100 miles, over the hardest and roughest of roads.



GROUT STEAM TONNEAU, WITH "COW-CATCHER" CONDENSER.

ing on the high gear—no other gears in mesh—is effected by adoption of the sliding gear system in its modern, improved form.

The Autocar Tonneau.

The 1903 model of the Autocar tonneau, with bevel gear chainless drive, is shown in the accompanying engraving from a photograph showing H. H. Mundy and A. A. Ledermann, of Utica, N. Y., and S.

Mr. Mundy is a member of the Miller-Mundy Motor Car Co., of Utica, which is representative of the Autocar in twenty counties and has one of the largest automobile stations in Central New York.

New features of this car are harveyized gears, fluted bonnet, high backed tonneau seats, leather apron under motor, and new pump oiler. The drive from the slide gear transmission system is through a longi-



LOCOMOBILE 16-HORSEPOWER GASOLINE MOTOR TONNEAU.

the engine valves when desired. The motor is a four-cylinder, vertical engine, placed in front under the bonnet, and ranges from 300 to 2,000 revolutions under load and with the high gear in mesh. The

Dorien, of Syracuse, in Mr. Mundy's new car, which was driven from the factory of the Autocar Co., in Ardmore, Pa., to Trenton, N. J., in two hours, without a single stop in the forty miles, and on the

tudinal shaft with two cardan points to a bevel gear on the differential. The motor is of the two-cylinder opposed type, disposed transversely under the bonnet with the flywheel in front. The cylinders are

lubricated by the splash system. The transmission gears are inclosed in an aluminum case under the footboard and run in oil. There are three speeds forward and reverse. The compensating gears are of the straight spur type, and, together with the drive gears, are inclosed and run in oil. Control is on the left side of the car and consists of a clutch lever and vaporizer throttle in one, operated by the left hand. Steering lever, gear shaft and spark timer are on one stancion, operated by the right hand.

The motor and transmission gear-case are mounted on a steel frame which is brazed together and suspended from the side bars in one mass, insuring perfect alignment of the motor and transmission system. There are three brakes, two on the wheel drums applied by a left foot lever, and the other a band brake acting on the main driving shaft at the transmission pinion and operated by a right foot lever in emergency. The latter locks at a given tension, relieving the operator of strain. All can be operated simultaneously. Wheels are of the artillery wood pattern, 30 inches in diameter and fitted with American ball bearings and three-inch tires.

The wheel-base of the 1903 Autocar is 6 feet 2 1/2 inches; the gauge 4 feet 6 inches, and the approximate weight 1,450 pounds.

The hickory side bars of the body are reinforced with quarter-inch steel plates on the inner side, and the dash board is

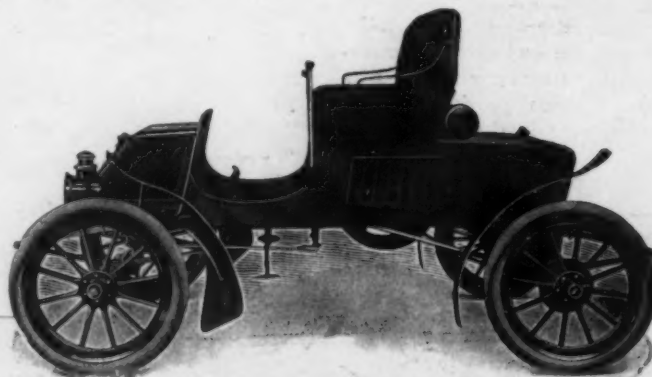
and red leather trimming, or dark green with black and gold striping and dark green leather trimmings. The trimmings are relieved with brass and nickel parts.

The 1903 Rambler.

Although the Model E. Rambler car retains the distinctive features of last year's

so as to deliver about 5 1/2 brake horse power when run at medium speed. The cooling water reservoir, containing nearly 400 radiating tubes, has been considerably enlarged to compensate for the increased size of the engine.

The transmission gearing, still of the planetary type, has been changed and is



RAMBLER 5 1/2-HORSEPOWER CAR. MODEL E.

machine, such changes and improvements have been made as were suggested by the knowledge gained during the past season. The lines of the body have been somewhat softened, the rather blunt appearance of the bonnet having been overcome and the rear of the body sloped to harmonize with the hood lines. The body is of the same length as before, but the seat has a solid back upholstered down to the cushion. One of the greatest changes made by

now weather, water and dust proof. The operating lever is connected to a countershaft beneath the footboard, and its arc of movement has been considerably reduced.

The differential, the casing and pinion carriers of which have been bolted or screwed together, has been radically changed, the whole case and sprocket being now made in one piece, and an end thrust bearing provided for the rear axle, totally prohibiting any end play.

The axles are of heavier material, the front axle in addition being reinforced its entire length. The rear axle revolves upon four sets of roller bearings, scientifically placed to equally divide the weight of the carriage. Three-inch tires are the standard equipment.

A new style of float-feed carbureter has been adopted after a summer's testing. The admission of gas and air are entirely automatic, and once being adjusted to the particular carriage, never again need altering.

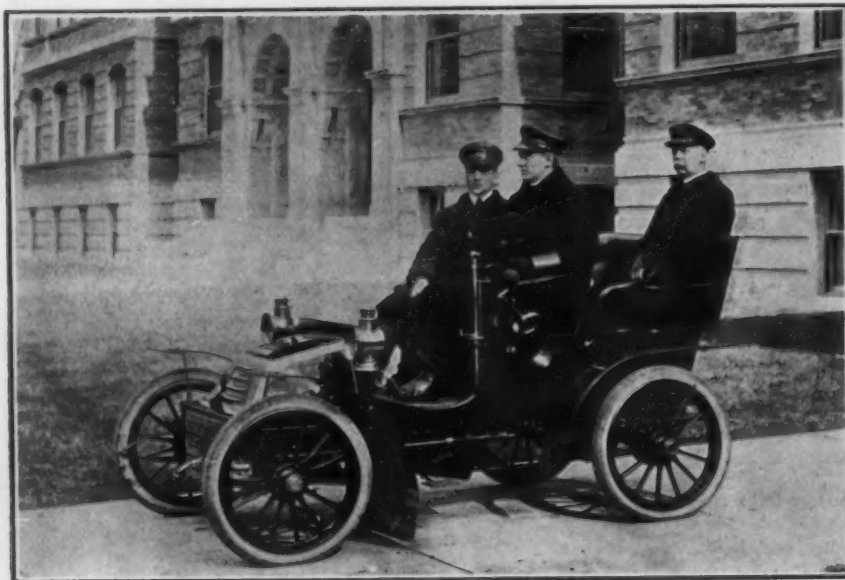
In addition to the usual brake on the transmission, a powerful brake acting on drums bolted to the hubs of the rear wheels is fitted.

It is possible to get at any part of the Rambler by removing the rear cover or raising the seat. The body is fastened to the steel frame by three bolts, and can be removed and replaced in a very few minutes.

The Rambler is finished entirely in automobile red, including the running gear, striped with fine black lines.

Hoffman Runabout and Touring Car.

The new combination runabout and touring car manufactured by the Hoffman Automobile & Mfg. Co., of Cleveland, Ohio, is now completed and ready for the market. It is fitted with a single-



AUTOCAR TONNEAU, 1903 MODEL, WITH LONGITUDINAL SHAFT DRIVE.

laminated in five pieces. Brass trimmings set off the body. The hood is of sheet metal, with brass trimmings and well ventilated. It is provided with a support for holding open, and has spring catches for preventing rattling.

The new car is finished in two colors only—red with black and gold striping

Thos. B. Jeffery & Co., of Kenosha, Wis., is in the adoption of artillery wood wheels with steel hubs having large flanges and wide-spaced ball races. The wheel-base has been increased to 78 inches and the body hung about two inches nearer the ground.

The motor has been increased in size

cylinder gasoline engine, set horizontally in the rear of the car and capable of developing from six to seven horse power. The cylinder measures five by six inches and the speed is controlled by a foot pedal which regulates the sparking and the amount of gasoline admitted to the cyl-

clutch and a power band brake, under the control of a foot lever, acts on the axle.

As a runabout, the vehicle has only the front seat, but with the addition of the tonneau, which can be quickly attached, it becomes a touring car.

A frame of angle iron rests on the four

screw so arranged as to take up all wear as soon as the steering mechanism begins to play in any part. The Longuemare carbureter and the Brown-Lipe differential are used, while the chain is a one-inch roller.

Artillery wood wheels have been adopted, the rear wheels having ball bearings and the front set fitted with rollers.

The finish is in standard colors. The upholstery is of buffed leather and curled hair. The car complete weighs about 1,200 pounds.

Interest In Washington Show.

Special Correspondence.

WASHINGTON, D. C., Jan. 10.—While the date of the local automobile show is still two months away, nearly every space has been booked, and applications for space are being received every day. Manager Washington is confident that the show will be the greatest in local history. Recent additions to the vehicles to be shown include the following makes: Knox, Stevens-Duryea, Stanley, Fournier-Searchmont, Northern, Columbia, electric and gasoline; U. S. Long Distance and Cadillac. Indian and Orient motor cycles and 20th Century lamps will also be exhibited. One of the attractions will be an automobile raffle, the holder of the winning ticket to have his choice of ten different machines.

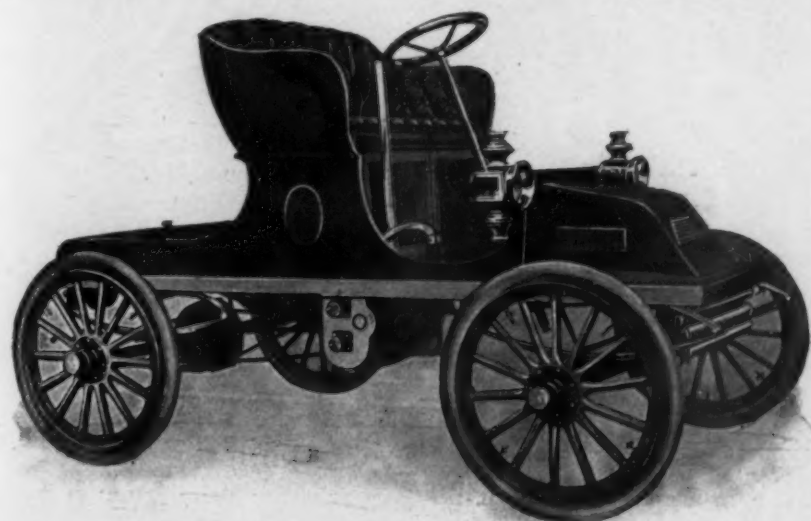
To Assemble Panhards in New York.

Arrangements have been completed by Smith & Mabley, of New York, whereby they will import Panhard chassis and parts and fit them with bodies made by J. M. Quinby & Co., of Newark, in a plant now being sought in or near New York. The imported parts and domestic bodies will be assembled here in exact reproduction of the French machines, thereby avoiding the higher duties on the vehicles imported in their completed state. Smith & Mabley have also secured the exclusive American agency for the Panhard cars.

Six-Passenger Steam Tonneau.

A steam tonneau to seat six persons, and built after the style of gasoline touring cars, is being constructed in the factory of Mansuy & Smith, in Hartford, by Raymond Goodrich, of the Hartford & New York Transportation Co., and Capt. C. M. Spencer, of Windsor, Conn. The vehicle has a wheel-base of ten feet. The boiler and engine are located forward under the bonnet. The water and fuel tanks are of large capacity. The chassis has already been completed and the body is in the paint shop.

Exports of motor vehicles and parts of same from the port of New York for the week ended January 10, are reported as follows: Cuba, \$1,116; Christiania, \$340; Havre, \$5,590; Japan, \$586; Lisbon, \$363; Mexico, \$18; Southampton, \$500; San Domingo, \$219.

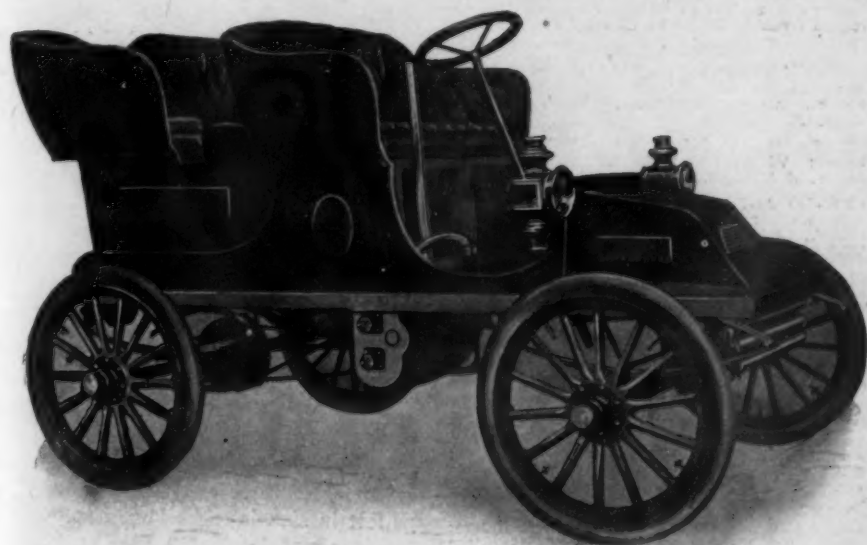


HOFFMAN CONVERTIBLE GASOLINE RUNABOUT.

inder simultaneously. A pump geared directly to the main shaft forces the water in the circulatory system through coils of the fin type placed somewhat low in front. The tank is in the rear. The water chamber, cylinder and cylinder head are of one piece, cast solid, while the gears are enclosed in an oil tight aluminum box.

elliptic springs and supports the body. The motor is suspended by a frame of channel iron. The tank for gasoline is under the seat. It will hold five gallons, sufficient to run the machine 135 or 140 miles. The jump spark system of ignition has been adopted.

The gears are of hardened steel, the Fel-



HOFFMAN CAR WITH TONNEAU SEATS ATTACHED.

They are mounted on a secondary shaft and are of the clash type.

One lever operates the clutch and emergency brake and another the gears. There are two speeds forward and one reverse. To reverse, the clutch must be disengaged. The emergency brake acts on the

low shaper being used for accuracy in cutting. Bronze bushings are used wherever they will produce the best results.

A small lever near the crank is used for relieving the compression when starting the machine.

The steering wheel is hinged and has a

Automobile Club Directory.

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New Station for Jersey City.

A large and completely equipped automobile storage, charging and repair station is to be built on Hudson County Boulevard at Duncan Avenue, Jersey City, by the Crescent Automobile Co. A lease has been secured on the building at this location by George E. Blakeslee, manager of the Crescent company, which is one of the largest concerns of its kind in Hudson county, and which has outgrown its present quarters at Communipaw and Crescent Avenues. The leased building is 40 feet square, and an addition 30 by 70 feet in size, is to be begun at once, to be completed by March 1. The Crescent company, which has also been conducting a business in bicycles and sporting goods, will give up these lines and confine its business to automobiles. Manager Blakeslee has recently returned from an extensive tour of inspection of the factories in Toledo, Detroit and Indianapolis. The Crescent company has secured the agency for the Cadillac automobiles, a line of which will be displayed at the Madison Square Garden show.

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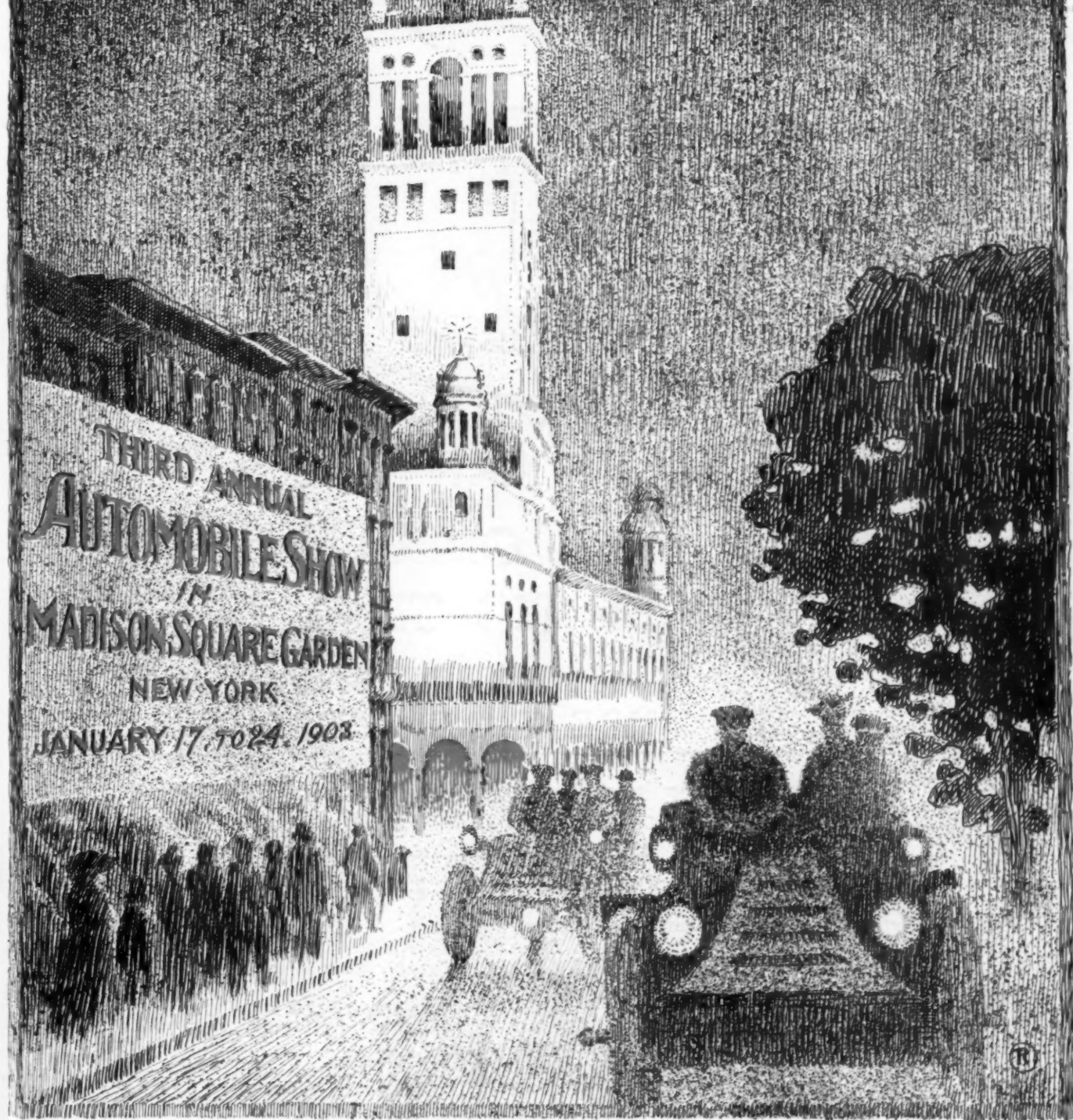
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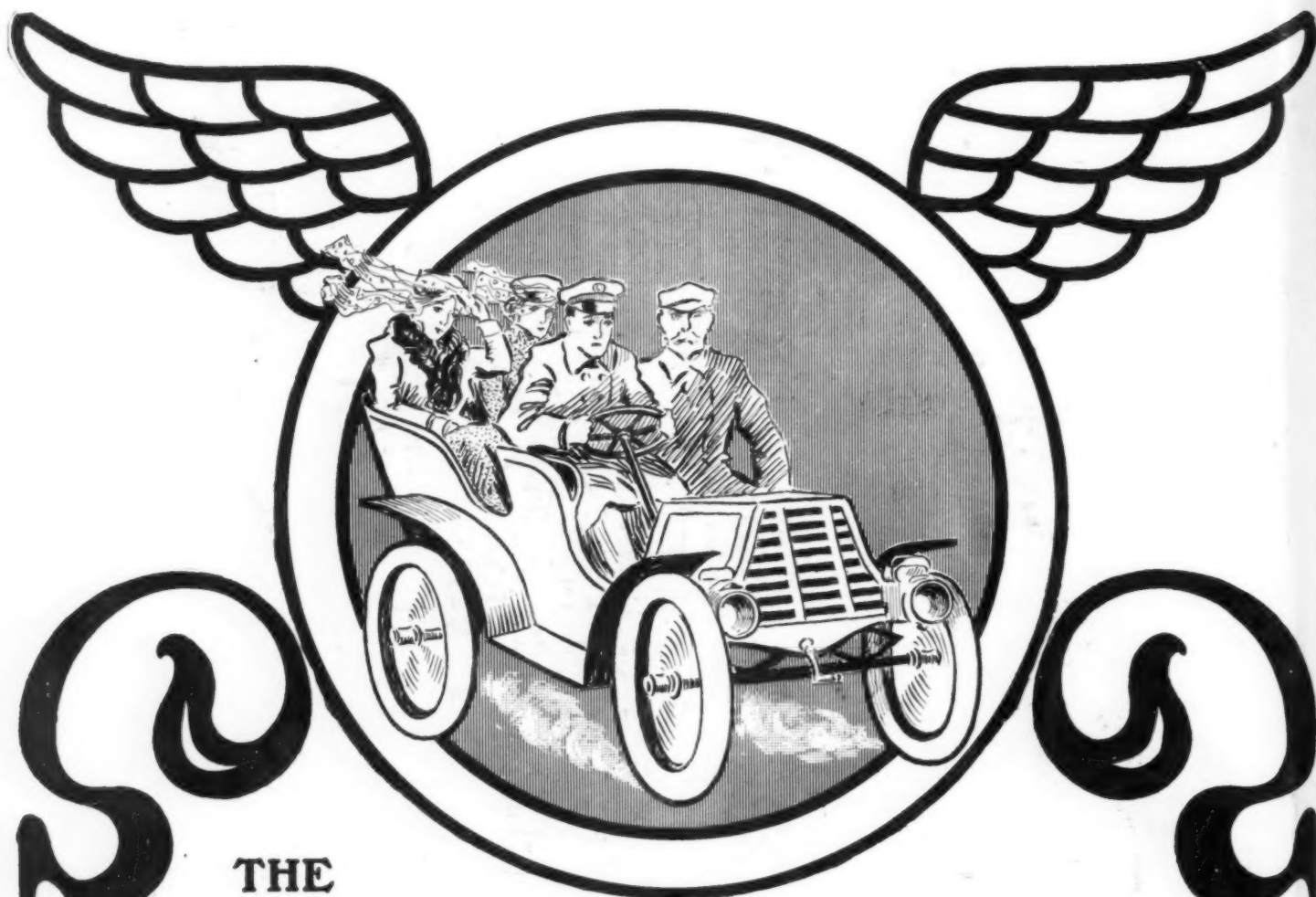


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